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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
OREGON OPERATIONS OFFICE
805 SW Broadway, Suite 500
Portland, Oregon 97205

January 15, 2008

Mr. Jim McKenna
Port of Portland & Co-Chairman, Lower Willamette Group
121 NW Everett
Portland, Oregon 97209

Mr. Robert Wyatt
Northwest Natural & Co-Chairman, Lower Willamette Group
220 Northwest Second Avenue
Portland, Oregon 97209

Re: Portland Harbor Superfund Site; Administrative Order on Consent for Remedial Investigation and Feasibility Study; Docket No. CERCLA-10-2001-0240. Comprehensive Round 2 Site Characterization and Data Gaps Analysis Report

Dear Messrs. Wyatt and McKenna:

The Comprehensive Round 2 Site Characterization and Data Gaps Report (Round 2 Report) represents a significant milestone for the Portland Harbor Remedial Investigation and Feasibility Study (RI/FS). The purpose of this document was to summarize the site characterization information collected to date and to identify the data necessary to complete the characterization phase of the Portland Harbor RI/FS. EPA believes that the Round 2 Report has presented a comprehensive picture of the site as a whole and advanced our understanding of the nature and extent of contamination and associated risks to human health and the environment at the Portland Harbor Site.

As we have discussed, EPA does not expect to provide formal approval or require that the Round 2 Report be revised and re-submitted. Rather, EPA is providing the attached comments on the Round 2 Report to guide the development of approvable RI and Baseline Risk Assessment (BRA) Reports. We believe that most of the key issues identified in these detailed comments have been identified in EPA's previous comments and discussions with LWG representatives.

Timing of Comments:

EPA has focused its review and provided comments in stages because of the comprehensive nature of the Round 2 Report and to ensure that the Round 3 data collection efforts to support the RI were completed in early 2008. The review elements are summarized below.

- April 10, 2007: EPA provided preliminary comments on Round 2 Report. The purpose of the preliminary comments was to focus on the finalization of Round 3 data gaps and to identify elements of the Round 2 Report that are critical to the development of the draft RI Report and the baseline ecological and human health risk assessments.

- June 8, 2007: EPA provided comments on the data gaps identification elements of the Round 2 Report. These comments and the Round 3B field sampling plans developed by the LWG served as the basis for determining the data necessary to complete the characterization phase of the Portland Harbor RI/FS. EPA and the LWG worked well together to resolve field sampling plan issues and most of the field work has been completed.

In order to facilitate the development of the draft remedial investigation (RI) and baseline risk assessment (BRA) reports, EPA is providing the attached detailed comments on Sections 1 through 9 and Appendices A, B, C, D, F and G of the Round 2 Report except as noted below. EPA expects to provide comments on the additional sections listed below according to the following schedule:

- Screening Level Risk Assessment: EPA is developing a stand alone screening level risk assessment (SLERA). EPA expects that the SLERA will be used to identify chemicals to be carried forward into the baseline risk assessment. The SLERA may be refined based on the results of the Round 3 data collection effort. EPA expects to provide the SLERA to the LWG on or about January 18, 2008.

- Problem Formulation for the Ecological Risk Assessment: EPA is developing a draft Problem Formulation for the Ecological Risk Assessment. This will serve as the basis for a final problem formulation to be developed by the LWG and a mechanism for reaching agreement how to perform the baseline ecological risk assessment (BERA). EPA expects to provide the Problem Formulation for the Ecological Risk Assessment to the LWG on or about January 18, 2008.

- Appendix E – Food Web Model and Biota-Sediment Accumulation Factor (BSAF) Development: Appendix E describes the methods that will be used to establish relationships between biota tissue and sediment concentrations. Due to the iterative and complex technical nature of this analysis and because these tools will be used to develop cleanup levels for Portland Harbor site and not to evaluate risks to human health or the environment, EPA expects to provide to comments on Appendix E on or about March 1, 20008.

- Appendix G – Toxicity Reference Values for the Baseline Ecological Risk Assessment: EPA and the LWG have reached general agreement on the toxicity reference values (TRVs) used in the screening level risk assessment. However, EPA and the LWG are not in agreement on the TRVs to be used in the baseline ecological risk assessment (BERA). EPA believes it is in the best interest of the project for EPA to provide direction to the LWG regarding which TRVs to use in the BERA. Developing direction on TRVs for the

BERA will require a detailed review of the TRVs and supporting information presented in the 2004 TRV Technical Memorandum, the 2006 Preliminary Risk Evaluation, and the Comprehensive Round 2 Report and other supporting literature. As a result, EPA expects to provide comments on the BERA TRVs on or about February 15, 2008.

- Floating Percentile Model: EPA's problem formulation for ecological risk assessment will include a weight of evidence approach for assessing the floating percentile and logistic regression methods for predicting benthic toxicity. EPA believes that both predictive models are useful lines of evidence for evaluating risks to benthic invertebrates. As a result, EPA's problem formulation will describe how to evaluate these two predictive models in light of the other lines of evidence for assessing risks to benthic invertebrates. The details behind the floating percentile model (FPM) were presented in earlier technical documents and are not presented in the Round 2 Report. EPA will need to evaluate these details in order to determine whether the FPM can be used as proposed by the LWG. EPA expects to complete this evaluation after the results of the Round 3 data collection activities are available.

- Section 10 – Preliminary Identification of iAOPCs and Associated Appendix H: The identification of initial preliminary remediation goals (iPRGs) and initial areas of potential concern (iAOPCs) are fundamentally tasks that should be addressed in the feasibility study (FS). EPA expects to provide comments on Section 10 and Appendix H on or about March 1, 20008.

- Section 11 – Conceptual Site Model and Associated Appendices I and J: Because Section 11 builds off the iPRGs and iAOPCs presented in Section 10, EPA expects to provide comments on Section 11 on or about March 1, 20008.

- General Guidance on the Feasibility Study: The Round 2 Report includes many elements of a feasibility study such as the development of iPRGs and the identification of iAOPCs. In the interest of the overall project schedule, EPA will provide guidance to the LWG on the feasibility study on or before February 15, 2008.

Key Issues:

EPA's review of the Round 2 Report has identified a number of key issues that must be resolved prior to delivery of the draft RI and baseline risk assessment reports. These issues are summarized below:

- The human health and ecological risk assessments should presented in an unbiased manner. Risk management decisions should not be factored into the risk assessment process.

- EPA does not believe that the risk evaluation used to develop iPRGs and iAOPCs is appropriately conservative. For example, sediment samples must be screened against sediment quality guidelines (SQGs) and surface water samples must be screened against site specific fish consumption criteria based on a 175 g/day fish consumption rate. In

addition, iPRGs were developed for only a limited number of metals and were not developed for certain key exposure pathways (e.g., fish consumption). Additional comments on the development of iPRGs will be presented in our comments on Section 10.

- The upstream fish tissue data should be used for informational purposes. EPA will determine background concentrations for sediment and water only.

- The human health risk assessment should include a residential and industrial surface water drinking water scenario. Surface water chemicals that screen in based on a comparison to MCLs and Region 6 screening levels should be evaluated. TZW chemicals that screen in based on a comparison to MCLs and Region 6 screening levels should be evaluated as a source of contamination to surface water with respect to the drinking water exposure scenario.

- The human heath risk assessment should evaluate clam and crayfish consumption. EPA acknowledges that sufficient clam tissue to support the exposure scenario must be available. As a result, EPA recommends evaluating clam consumption on a river mile by river mile basis.

- EPA does not agree with the 5000 fold dilution factor applied to TZW when evaluating the shellfish consumption exposure scenario. TZW data should be evaluated as a line of evidence in the baseline human health risk assessment. Shellfish tissue should be used as the primary line of evidence. Areas or chemicals for which shellfish data are not available should rely on the TZW results and assess the lack of tissue data in the uncertainty section of the HHRA.

- TZW should be used as a line of evidence in the ecological risk assessment. AWQC and other water TRVs should be used to evaluate the risk associated with exposure to TZW.

- The screening level risk assessment for the ecological risk assessment did not consider sediment quality guidelines (SQGs). EPA will be submitting the SLERA in the near future.

- Exposure point concentrations must be developed on a scale that is appropriated for the receptors of concern. It is inappropriate to consider a side-wide exposure area for evaluating risks to the benthic community.

- Several comments provide recommendations regarding the presentation of data and analysis in the RI and BRA reports. Examples include the following:
    - Mapping site data relative to risk thresholds. In some cases, risk thresholds may be too conservative to provide meaningful information (i.e., the majority of the sediment, tissue or water data exceed the threshold), and order of magnitude multipliers of the risk thresholds should be used. This will greatly improve the presentation of site data by putting into a risk based context;
    - Separating actual data sections and tables from calculated, extrapolated, and

interpreted results;
- Providing histograms or scatter plots that include risk threshold levels and, where EPA is in agreement, background levels; and
- Highlighting trends and patterns in tables, figures and graphs rather than subjective text.

Directive Nature of Comments:

EPA has provided its comments on the Round 2 Report in the attached comment table. To the extent possible given the complex nature of the Comprehensive Round 2 Report, EPA has provided specific direction regarding the development of the draft RI and BRA Reports. EPA believes that to keep the project on schedule, we must minimize the time it takes to resolve the comments. As a result, EPA has categorized the comments according to the following criteria:

- Category 1: These are general comments or notes. In many cases, no action to address the comment is necessary.
- Category 2: These are comments on data presentation, clarifying statements and incorporation of new or additional information. In some cases, further discussion on the best way to present information will be necessary. EPA recommends reaching agreement on the data presentation process prior to development of the draft RI and BRA Reports.
- Category 3: These are comments on subjective or judgmental language, clarification and where additional information is required. Language changes are generally required. EPA has generally recommended removing this type of language.
- Category 4: These comments represent EPA direction on the data analysis. EPA expects that these changes will be incorporated. The majority of these comments relate to the human health and ecological risk assessments.
- Category 5: Additional direction will be forthcoming. For example, EPA will be providing a problem formulation for the ecological risk assessment.

Next Steps:

EPA and the LWG should discuss the specific recommendations in our comments and other approaches to improve the RI and BRA documents and associated data presentations. We believe there may be some merit in using elements of the "streamlined" approach that was presented at the recent "Optimizing Decision-Making and Remediation at Complex Sediment Sites" conference. This will allow us to minimize subjective or judgmental text, facilitate the development and review of the RI and BRA Reports and rely to the extent possible on tables, figures, graphs and maps to present the site information.

As previously noted, EPA does not expect the Round 2 Report to be revised. The attached comments should be incorporated into the draft RI and BRA reports. EPA expects that our comments on Sections 1 through 7 to be readily incorporated into the draft RI report as appropriate, and that minimal time for discussion and resolution of comments will be required. While a few comments on the human health risk assessment will require further discussion, the

topic that we expect the most discussion on is our comments on the ecological risk assessment. EPA believes that the EPA developed problem formulation will serve as good vehicle for reaching agreement on how to perform the BERA.

EPA appreciates the LWG's efforts to finalize the Round 3 sampling plans and collect the necessary data to fill the RI data gaps in line with our projected schedule. We are looking forward to working with the LWG to resolve these comments, expedite the review and incorporation of the Round 3 data results, and proceed with preparation of the draft RI and Risk Assessment Reports. If you have any questions, please contact Chip Humphrey at (503) 326-2678 or Eric Blischke (503) 326-4006. All legal inquiries should be directed to Lori Cora at (206) 553-1115.

Sincerely,

Chip Humphrey
Eric Blischke
Remedial Project Managers

cc: Greg Ulirsch, ATSDR
Rob Neely, NOAA
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Erin Madden, Nez Perce Tribe
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EPA Comments on Comprehensive Round 2 Site Summary and Data Gaps Analysis Report
Sections 1 – 9 and Appendices A, B, C, D, F, and G
January 15, 2008

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
1	General Comment	N/A	N/A	2	The Round 2 Comprehensive Site Summary and Data Gaps Analysis Report (Round 2 Report or, simply, Report) presents a large amount of information collected through the Portland Harbor Remedial Investigation. Additional information has been collected as part of the Round 3 data collection effort and at upland facilities throughout the study area. It is challenging to present such a large amount of data clearly. EPA recommends that the draft Remedial Investigation (RI) and Baseline Risk Assessment (BRA) present results in a streamlined fashion to facilitate review and understanding of the information. To the extent possible, the draft RI and BRA Reports should rely on figures, tables and graphs Subjective text regarding the importance of information or results should be minimized. Rather, factual information should be presented in tables, figures and graphs and used to highlight significant trends, patterns and concepts.
2	General Comment	N/A	N/A	2	It is critical that the baseline risk assessments present an objective assessment of risk at the site. Data should be evaluated based on the relevant scale of the receptor. Data points that exceed risk-based criteria should be identified. This will allow EPA to make the appropriate risk management decisions at the site. For example, it may be that only 1 data point amongst 4 or 5 spatially related show risk to the benthic community. In that case, EPA may determine that action is not warranted because one small area exceeding risk-based thresholds does not present a risk to the benthic community. However, if each of the 4 or 5 spatially related samples exceed risk-based thresholds, this area will likely be identified as an AOPC that must be remediated to protect the benthic community. However, it is inappropriate not to identify the single sample as being above the risk-based criteria.
3	General Comment	N/A	N/A	2	The Round 2 Report includes many instances of qualifying or judgmental statements. These statements should generally be replaced with factual statements supported by site data and other information. This is a particular concern with the preliminary human health and ecological risk evaluations. There are numerous statements that suggest that the exposure assumptions and effects information are overly conservative. The risk evaluation process proposed by EPA relies on exposure assumptions consistent with a reasonable maximum exposure (RME) approach and an effects assessment that is consistent with EPA guidance and standard risk assessment practices. A discussion of the uncertainties associated with the exposure assumptions and the effects assessment should be presented in the uncertainty section for the baseline human health and ecological risk assessments.
4	Executive Summary	General Comment	N/A	2	The Draft Remedial Investigation (RI) and Baseline Risk Assessment (BRA) Reports should each include a comprehensive executive summary. Although an executive summary of the type included in the Round 2 Report may be produced by the Lower Willamette Group (LWG), it should be considered a standalone document produced for LWG's benefit and should not be included as part of the draft RI or BRA.
5	Sec 1	1.1	1-2	3	The term "Study Area" as used in the Round 2 Report refers to the area of investigation from approximately RM 2 to RM 11, and the Round 2 Report presents LWG's evaluation for this area. The "Study Area" for the RI Report will include additional adjacent areas upstream of RM 11 and downstream of RM 2 where data have been/are being collected as part of Round 3. This area includes approximately RM 1 to RM 12.2 and a portion of Multnomah Channel.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
6	Sec 1	1.2	1-2	1	This section states that the ultimate purpose of the Round 2 Report is to evaluate the current data gaps for the site and identify the data needed to complete the RI/FS. EPA acknowledges this purpose. However, the Report includes many elements of a baseline risk assessment and feasibility study. As a result, EPA's review focuses on these elements of the Report, with the understanding that our comments will be folded into the BRA and FS as appropriate.
7	Sec 1	1.2	1-3	3	EPA does not agree that the iPRG and iAOPCs presented in the Round 2 Report represent a conservative approach. The iPRGs were not based on the screening-level risk assessment but on a more refined risk analysis. In addition, this evaluation did not evaluate all lines of evidence. For example, sediment quality guidelines and the logistic regression method for predicting benthic toxicity were not used as lines of evidence for the evaluation of benthic risk. As a result, the development of iAOPCs considered only 3 metals – arsenic, mercury and zinc – even though other metals could be mapped based on application of sediment quality guidelines and the predictive models for benthic toxicity.
8	Sec 1	1.3	1-4	3	The draft RI Report should note that although some portions of Portland Harbor are "heavily industrialized," there are areas of Portland Harbor that are currently undeveloped, such as the Willamette Cove site and portions of the PGE Harborton site near the entrance to Multnomah Channel. In addition, there are numerous beach areas at active facilities that are more or less in a natural state, such as the Oregon Steel Mills site and the downstream end of the Arkema site.
9	Sec 2	2.1.2.2.2	2-4	2	The first sentence of Section 2.1.2.2.2 states that 1870 fish tissue samples were collected. The Report should clarify that this was the total number of organisms collected and include a table that details how many composites were collected on a species-by-species basis.
10	Sec 2	2.1.2.2.2	2-4,5	4	This section also includes a statement about the upstream fish tissue samples collected at RM 20 and RM 28. These data should be used for information purposes only. EPA will not be using this information to establish cleanup levels at the Portland Harbor site nor to develop background concentrations.
11	Sec 2	2.1.2.2.2	2-5	2	The Report should note that the 3 ammocoetes collected during Round 1 were not analyzed.
12	Sec 2	2.1.3.5	2-9	2	The Report should include a statement about the relationship of the transition zone water (TZW) data to DEQ source control efforts – i.e., that the data may be used to support upland source control evaluations. EPA generally agrees with the stated purpose as the primary purpose of the TZW data.
13	Sec 2	2.1.3.6	2-11,12	2	The Report should note that the source-specific surface water samples were also collected to characterize risk to aquatic receptors.
14	Sec 2	2.2	2-16	1	It is critical that all historical and concurrent studies be identified. Although EPA is not aware of any specific studies that have been excluded, all relevant data collected to support upland investigations, dredging projects and other activities must be evaluated for usability and included in the Portland Harbor database, as appropriate
15	Sec 2	2.2.4	2-18	2	EPA and its government partners are using the Query Manager (QM) database. In addition, QM is being provided to members of the general public due to its ease of use. Although EPA approved the site characterization and risk assessment (SCRA) procedures, the Report should note the differences between the SCRA database and the QM database. Key elements include summing of individual PAH compounds and other chemicals, and reporting of field duplicates.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
16	Sec 2	2.3.2	2-20	2	The Report states that sediment bed movement does not occur under typical river flows. The Report should also note that during high flow events, sediments may be mobilized. Although sediment transport does occur under typical flow conditions, EPA agrees that the use of post-1997 (high flow year along with 1996) data is generally representative of current conditions. The Report should note that the age of the contaminant release is another factor when assessing to what extent the dataset is representative.
17	Sec 3	3.1 and 3.2	3-2 to 3-5	3	While not inaccurate, the Report seems to emphasize the modified nature of the river. EPA acknowledges that the Willamette River has been heavily modified over the past 150 years. However, the draft RI Report should note that habitat areas in a relatively natural state are present within Portland Harbor and that the river is used by aquatic life, birds and mammals.
18	Sec 3	3.1	3-2	2	The statement that the lower river (below RM 2) is narrower should be qualified – e.g., slightly narrower than much of the study area – or the Report should provide average width information.
19	Sec 3	3.1	3-2	2	The Report states that LWR is generally a 'trap for suspended and bed-load sediments that enter the Study Area, a regional sediment repository for the overall LWR (RM 0 to 26)." The draft RI Report should avoid such overgeneralizations. For example, although deposition tends to be most prevalent in certain reaches of the river (e.g., RM 8 -10) and within slips and embayments (e.g., the Willbridge docks and the International Slip), other areas may be erosional or in dynamic equilibrium.
20	Sec 3	3.1	3-2	2	The Report should note that storing water in the winter and releasing it in the summer tends to reduce winter flows and increase summer flows.
21	Sec 3	3.1	3-3	2	The Report states that 'the navigation channel from RM 8 to 10 has historically required regular maintenance dredging.' This statement should be supported by noting that 346,000 cubic yards of material were dredged in this reach in 1997. Dredging projects prior to 1997 and the Corps' current plans for dredging this reach should also be summarized to support this statement.
22	Sec 3	3.1	3-3	2	The Report states that "Multnomah Channel exits the Study Area at RM 3, taking a significant fraction of the flow with it as the LWR continues to widen. This results in a second area of extensive shoaling in the channel from RM 3 to RM 2." Bathymetric surveys conducted by the LWG should be cited to support this statement.
23	Sec 3	3.1	3-3	1	The Report states that "Small-scale (i.e., less than 30 cm) scour and deposition is widespread..." This statement supports EPA's previous comment regarding the dynamic nature of the lower Willamette River.
24	Sec 3	3.3	3-5	2	The Report should reference the Portland Harbor Joint Source Control Strategy (PH JSCS) as a joint EPA/DEQ document.
25	Sec 3	3.3	3-5	2	The Report incorrectly states that 'sources to the river are defined in this report as the migration pathway through which chemicals enter the river' is consistent with the PH JSCS. The PH JSCS states that sources to the river are defined as upland contaminant sources that have complete or potentially complete contaminant migration pathways to the river. The draft RI Report should incorporate this definition.
26	Sec 3	3.3	3-5	2	Overland transport is not a direct discharge; thus, the "/" should be a "," between "waste water" and "overland transport." Overwater activities should be included as a pathway in this sentence. Historical sources are not a pathway; thus, "and historical sources" should be omitted from this sentence.
27	Sec 3	3.3	3-6	4	Groundwater discharges to the river should be evaluated as a loading term to the site and on a concentration basis at the point of discharge. While the discharge areas may be small in comparison to the entire site, the concentrations at discharge points may result in exposure to benthic invertebrates until the groundwater plumes are controlled and the remaining contamination is either addressed through sediment remediation.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
28	Sec 3	3.3	3-6	4	Upstream Loading: The draft RI Report should clarify that upstream loading will be estimated based on data collected at RM 15 and is expected to represent contaminant loading from the Willamette River watershed and not from specific sources of contamination. EPA expects that specific upstream sources of contamination will be addressed through the appropriate regulatory mechanism.
29	Sec 3	3.3	3-6	2	Groundwater: The 3rd sentence states that "[s]ignificant contamination migration via the groundwater pathway is limited to discharges from a small number of upland sites within the Study Area." However, Table 5.1-2 shows that many of the groundwater plumes are not fully characterized. This discrepancy should be clarified in the draft RI Report. In addition, the last sentence states that "chemicals from upland groundwater to surface water is not considered a significant pathway, given the small volume of groundwater discharging to the river." As stated above, while groundwater load may be small compared to the entire river, it could be significant in certain areas and should not be discounted.
30	Sec 3	3.3	3-6	2	Bank Erosion/Leaching. This section should include a discussion of leaching from bank soils to the river in addition to bank erosion. The Report should clarify why riverbank soils are likely to have been a significant historical contributor. Further characterization and the evaluation of bank erosion should be performed as part of upland investigations or during remedial design for sediment remedies to ensure that riverbank contamination is effectively addressed as a source of sediment or surface water contamination.
31	Sec 3	3.3	3-6	2	Overwater Activities. The term "full releases" should be defined. The draft RI Report should specify the information sources consulted to document overwater spills prior to 1980. For example, were DEQ and USCG files consulted? What about historical libraries or associations, university libraries (e.g., Portland or Portland State), etc.?
32	Sec 3	3.3	3-7	2	The draft RI Report should note that while greater regulation of stormwater currently takes place, many COCs are still not monitored. EPA also disagrees that combined sewer overflows (CSOs) are no longer a source of contamination; only if 100 percent of the combined sewer is directed to a treatment works and never overflows would the CSO as a source no longer exist.
33	Sec 3	3.3	3-6	2	The discussion of CSOs should include additional detail regarding the nature of these discharges and City of Portland efforts to control them.
34	Sec 3	3.3	3-6	2	In the groundwater discharge discussion, the Report should note the potential for colloidal transport, in addition to NAPL and dissolved contaminant transport.
35	Sec 3	3.3	3-6	2	The Report concludes that chemical loading from groundwater is low. Although this may be true from a site-wide perspective, the draft RI Report should also note the potential for localized effects.
36	Sec 3	3.4.1	3-7	2	The Report should note that there are exceptions to the low levels of sediment contamination in the navigation channel. For example, there are pockets of PAH contamination in the vicinity of the St. Johns Bridge.
37	Sec 3	3.4.1	3-7	2	The initial risk screening should note that DDT and PCBs are key drivers site-wide and present risk to consumers of fish (birds, mammals and humans).
38	Sec 3	3.4.1	3-7	2	The Report should identify areas with PCB levels greater than some multiplier of risk-based levels. For example, a multiplier of the DEQ bioaccumulation Guidance screening level of 0.048 ug/kg (e.g., 48 or 480 ug/kg) could be used to identify areas of contamination, potential sources of contamination, and principal threat or hot spot level contamination.
39	Sec 3	3.4.1	3-7,8	2	The Report should include additional discussion about other chemicals – e.g., chlorinated dibenzo-p-dioxins and furans (Rhone Poulenc and McCormick and Baxter); metals (ship maintenance and construction and stormwater outfalls); phthalates (Schnitzer, Swan Island Lagoon); and others.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
40	Sec 3	3.4.1	3-7	2	The Report should include a discussion of distribution and range of chemicals in fish – e.g., PCBs in Swan Island Lagoon.
41	Sec 3	3.4.2	3-9	3	The draft RI Report should note the limitations of the transition zone water (TZW) results. The purpose of this data was to confirm the release of 9 upland groundwater plumes and assess the risk associated with TZW. Although the TZW study confirmed a link between upland groundwater contamination and the Willamette River, the data are limited in temporal and spatial scale.
42	Sec 3	3.4.3	3-9	2	The Round 2 Report states that water column concentrations of many organic iCOCs were greater in the study area than at RM 11. This seems to contradict the statement made in Section 3.3 (Upstream Loading) that the upstream loading was expected to be a significant contributor to contaminants in the Study Area. Further discussion of this apparent contradiction is required – for example, the Report should consider the contribution of sources within the study area such as loading from stormwater, groundwater and riverbank erosion, and transport processes with site such as sediment resuspension.
43	Sec 3	3.4.3	3-9	2	The Round 2 Report states that concentrations of iCOCs were greater at depth than at the surface. The draft RI Report should clarify whether this observation applied to both total and dissolved contamination. For example, if the discussion is focused on total concentrations, the observed difference may be related to resuspension of sediment particles. However, if the sample was filtered, then it could be due to a groundwater plume, leachate from clean groundwater moving through contaminated sediment, or a direct discharge located at or near the river bottom.
44	Sec 3	3.4.3	3-9	2	The trend in pesticide concentrations generally matches the agricultural use of pesticides (i.e., application in Spring/Summer). However, the draft RI Report should note that surface water sampling was not conducted in every month of the year in 2004/2005. The fact that other pesticides (e.g., DDx) did not follow the agricultural use model is likely a result of the decreased use of these pesticides and the fact that there are major sources of these chemicals within the Study Area. The draft RI Report should state whether there was a trend in the DDx results. The Report only states that there was no trend for PCBs, which also makes sense because it was only used historically and there are sources within the Study Area.
45	Sec 3	3.5	3-11	2	The Round 2 Report states that groundwater discharges and wastewater discharges are not expected to be a significant source of PCBs, DDx and dioxin and furans. Although EPA generally agrees with this statement, EPA believes that stormwater loading may be a significant source of PCBs. In addition, groundwater and/or stormwater discharges of DDx may be significant at the Rhone Poulenc and Arkema sites.
46	Sec 3	3.5	3-11	2	The Report states that "Upland groundwater plume discharge is expected to be relevant for cyanide and VOCs." Other chemicals present in groundwater may also be significant, such as PAHs, metals, and pesticides.
47	Sec 3	3.5	3-11	4	For atmospheric deposition, the Round 2 Report only considers direct deposition to the waterway. This pathway should consider atmospheric deposition to the watershed as a whole in the draft RI Report in terms of upriver loading and stormwater loading, to aid in the evaluation of background conditions.
48	Sec 3	3.5	3-10	2	The Report should note that although chemicals such as PCBs, DDT and dioxin tend to be bound to sediments and have low water solubility, due to their toxicity and tendency to bioaccumulate, their levels in surface water, though very low (picograms [pg]/L), may be significant from a risk standpoint.
49	Sec 3	3.5	3-11	2	Regarding historical releases of PCBs and similar chemicals, the Report should note that the discussion is limited to historical releases within the study area. In addition, the Report should include a discussion of recent stormwater data, which indicates that stormwater loading may be a significant source of these chemicals.
50	Sec 3	3.5	3-10	2	The Report should mention the potential for sediment resuspension within the study area to mobilize chemicals.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
51	Sec 3	3.5	3-10,11	3	The discussion about the relative contribution of surface water in response to remediation of sediments makes a lot of assumptions. The draft RI Report should state that upstream surface water concentrations are expected to decline over time due to additional actions (e.g., water quality initiatives and controls, remediation of contaminated sediments offshore of the Zidell facility) In addition, study area surface water concentrations may also decline in the future as a direct result of sediment remediation.
52	Sec 3	3.5	3-11	2	EPA does not expect that bank armoring alone will be sufficient to reduce bank erosion of contaminants. Bank remediation efforts will be required, although we do recognize that engineered bank stabilization efforts can be an effective component of source control.
53	Sec 3	3.6.1	3-12	4	Other scenarios that may be added to the HHRA (e.g., drinking water scenarios for workers and residences, diver scenario, and breast-feeding) must be incorporated into these sections.
54	Sec 3	3.6.1	3-12	4	A protected use of the Willamette River is drinking water. As a result, the draft RI Report should discuss potential drinking water uses of the Willamette River.
55	Sec 3	3.6.1	3-12	3	Dockside Worker section: The draft RI Report should not include the statement: "Although exposure is anticipated to be infrequent to nonexistent...".
56	Sec 3	3.6.1	3-12	3	In-Water Worker section: The draft RI Report should not include the statement: "Although most of these activities are unlikely to result in significant sediment contact,...".
57	Sec 3	3.6.1	3-12	3	Transient section: The draft RI Report should not include the statement: "however, there is no evidence that this actually occurs." In the Linnton survey, one individual stated that he "Sometimes drinks from river, but he heats the water up."
58	Sec 3	3.6.1	3-13	3	Native American Angler section: The draft RI Report should append the phrase, "or through inadvertent sediment exposure (e.g., eating food with contaminated hands)" to the end of "Native American anglers who fish from boats or piers could be exposed to in-water sediment on anchors and hooks."
59	Sec 3	3.6.1	3-13	3	Non-Tribal Angler section : The draft RI Report should include the following statement: "In a survey done by the Linnton Community Center, transients were asked about their consumption of fish or shellfish from the Willamette River. These transients reported consuming a large variety of fish, as well as crayfish and clams, and several transients said they ate whatever they could catch themselves or get from other fishers." Remove the last sentence starting with, "Although there is little evidence...."
60	Sec 3	3.6.2	3-13	4	This section of does not describe TZW as a complete exposure pathway for fish. In addition, seeps are not mentioned. This section should be revised in the draft RI Report to reflect the exposure assumptions presented in EPA's problem formulation for the ecological risk assessment.
61	Sec 3	Figures	Figure 3.0-1	2	A number of pathways are omitted in the human health CSM – e.g., contaminated banks, overwater work, evaporation, drinking water, harvesting shellfish. Further, Transition Zone Water should include a link to contaminated groundwater and upland source areas, and the arrows for Overland Runoff should be directed to the river. A revised CSM should be included in the draft RI Report.
62	Sec 4	General Comment	N/A	2	The draft RI Report should include revised modeling sections that incorporate changes that have occurred due to the different modeling sub-groups, related discussions, and comments submitted for those modeling documents.
63	Sec 4	4.1.1	4-2	2	This is a general description of commercial/industrial activity, structures & outfalls. It should reference the relevant sections in the Report with the detailed information – e.g., previous section references, Section 5 on potential sources of chemical releases.

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64	Sec 4	4.1.2	4-3	2	Relevant information from the U.S. Army Corps' Dredged Material Management Plan (DMMP) update should be incorporated and presented. A draft DMMP Report is available and should be consulted for this information.
65	Sec 4	4.1.2	4-3	2	The information in this section should be updated based on recent dredging activity – the most recent project shown is 2005. The map should be expanded to include the area between RM 11.7 and at least RM 12 (individual berth maintenance).
66	Sec 4	4.1.2	4-3	2	Include information, where known, on planned dredging – i.e., where there are authorized multi-year permits. For example, according to recent public notices more dredging is planned at the following facilities: T2 (Berths 205 and 206) and T5 (Berths 501 and 503), T4, CLD Pacific and Gunderson.
67	Sec 4	4.1.2	4-3	2	Dredge prisms should be presented where available. Areas where bottom prism data are available should be depicted on maps. SAP data from individual dredging projects should be provided when available. Even if dredging has already occurred, this information may be useful for source control/CSM. The information presented is incomplete for Goldendale (need to identify dredge volume and prism) and Cargill (need to identify dredge prism).
68	Sec 4	4.1.2	4-3	2	This section discusses bathymetry. The draft RI Report should discuss sediment bed elevation changes, as well.
69	Sec 4	4.1.4	4-6	4	The Report states that "...considerable areas [of outfall drainage basins] were not characterized into either category [overland flow vs. outfall conveyance]." These characterizations should be completed for the draft RI Report.
70	Sec 4	4.1.4	4-6	4	p. 4-6, 4th paragraph. In the draft RI Report, LWG should attempt to locate and characterize with respect to their drainage characteristics (e.g., location and size of drainage basin, chemicals handled or released within the basin, etc.) all outfalls within the Study Area.
71	Sec 4	4.1.4	4-6	2	The draft RI Report should include a discussion of historical stormwater drainage, e.g., how land use has changed over time, changes in overland flow vs. outfall conveyance, etc.
72	Sec 4	4.1.4	4-6	4	The number of stormwater outfalls should be verified. The City of Portland has identified 322 outfalls. The Round 2 Report has verified 158 outfalls. If necessary, additional effort should be expended to locate and verify additional outfalls.
73	Sec 4	4.1.4	4-6	2	A figure should be included in the draft RI Report that depicts outfalls that are regulated – e.g., via NPDES & other permits.
74	Sec 4	4.1.4	4-6	2	The Report states that all but two CSOs (17 and 46) between RM 2 and 11 were fully abated by 2006. Additional information on CSO abatement should be provided in the draft RI Report. The potential for future releases from fully abated and partially separated CSOs should be presented and discussed. In addition, information should be presented regarding the status of upstream CSOs. The draft RI Report should differentiate between CSMs and purely stormwater discharges.
75	Sec 4	4.2	4-13	2	The Report states "at the max flood tide during the low flow period, reversed flows extend upstream beyond RM 11.5." The Report should present information about maximum upstream flows and how far upstream flow reversal occurs.
76	Sec 4	4.3.3.2	4-16	2	The draft RI Report should also include a summary of flow conditions when both the Willamette and Columbia Rivers are at high flow.
77	Sec 4	4.4.2.2	4-19	2	The draft RI Report should discuss the relationship between suspended sediment flow and bedload and river flow, including a discussion of very high flow events.
78	Sec 4	4.4.2.3.2	4-22	2	The suspended sediment City data (2001-2006) presented in 4.4-3a do not include very high flow events (e.g., greater than 200,000 cfs). The draft RI Report should discuss how this may affect predictions.

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79	Sec 4	4.5.1	4.23	2	Are the shear stresses presented upstream from the hydrodynamic sedimentation model or measured? How much uncertainty in those values?
80	Sec 4	4.6.2	4-27	2	This section should include a statement that open water and shoreline habitat are important for migration, and to some extent rearing, of salmonids and lamprey in the system.
81	Sec 4	4.6.2	4-27	2	The Report states that isolated wildlife habitat areas exist but that linkages to the larger landscape are limited. The draft RI Report should identify exceptions to this such as connections between the Willamette River and Forest Park.
82	Sec 4	4.7	4-28ff	2	Specific areas that are zoned industrial sanctuary in the Portland Comprehensive Plan Map should be presented in the draft RI Report.
83	Sec 4	4.7	4-28	2	The draft RI Report should include (or reference) the latest version of the Greenway plan update and related land use policies and zoning
84	Sec 4	Maps	Map 4.7-1	2	Map 4.7-1 should be modified to reflect additional areas were transients are presents such as 06B026 and 06B030. The draft RI Report should note that transient camps have also been observed near the Cathedral Park/MarCom property line, and that the entire beach between Willamette Cove and MarCom (inclusive) has the potential for transient use.
85	Sec 4	4.7	4-30	2	The draft RI Report should include more detail/description on the limited commercial crayfish fishery.
86	Sec 4	4.7	4-28ff	4	Other scenarios that may be added to the HHRA (e.g., drinking water scenarios for workers and residences, diver scenario, and breast-feeding) must be incorporated into these sections.
87	Sec 4	4.7	4-30	3	The draft RI Report should not include the word "limited" before "commercial crayfish fishery."
88	Sec 4	4.7	4-30	2	Information from the Linnton Community Center's survey of transients' biota consumption from the site should be included (e.g., "In a survey done by the Linnton Community Center, transients were asked about their consumption of fish or shellfish from the Willamette River. These transients reported consuming a large variety of fish, as well as crayfish and clams, and several transients said they ate whatever they could catch themselves or get from other fishers.")
89	Sec 4	Figures	4-1.1 [s/b 4.1-1]	2	The draft RI Report should distinguish between areas where stormwater drains towards Columbia Slough and where stormwater discharges to the Willamette River. In addition, the stormwater discussion should be expanded to include drainage areas between RM 11 and 12.
90	Sec 4	Figures	4.3-1,2	2	The draft RI Report should include Willamette River stage information and Willamette River daily mean discharge through 2007/2008.
91	Sec 4	Tables	4.1-1	2	Table 4.1-1 Property Name Index – RM 2 to 11. In the draft RI Report, this should be expanded to include information from RM 1 and upstream to RM 12.
92	Sec 4	Tables	4.1-2	2	Table 4.1-2 Dredging projects; The current table covers up to RM 11.6. The draft RI Report should include information up to RM 12. A link to maps and where to find SAP data and bottom of prism data should be provided.
93	Sec 4	Tables	4.1-4	2	*Table 4.1-4 – Historic Overwater Features: Again, the draft RI Report should include areas from RM 1 through RM 12.*

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
94	Sec 5	Exec Summ	ES5-i	3	EPA disagrees with the statement that historical sources have largely been controlled. Perhaps is it is a matter of what is meant by historical source; however, there are still several historical sources which are significant to the Study Area (e.g., GASCO, Siltronics, Arkema, Gunderson, Willamette Cove, Oregon Steel Mills, etc.). In addition, groundwater should be identified as a significant pathway due to the number of chemicals in TZW that exceed screening criteria even though it may not present a risk from a site-wide perspective.
95	Sec 5	Exec Summ	ES5-ii	2	The Site Summaries are limited to releases at 79 properties. The draft RI Report should state the basis for identifying these sites as current or historical sources, and should recognize the potential for future sources.
96	Sec 5	Exec Summ	ES5-ii	2	The Report states that there is evidence that groundwater from 14 facilities or properties may currently transport upland contaminants to the river, and that groundwater at the remaining upland parcels is either not a current pathway or deemed to pose an insignificant risk. The draft RI Report should describe why 9 of 14 sites with potential groundwater discharges were evaluated in the TZW groundwater pathway evaluation. In addition, there are too many groundwater plumes that are not fully characterized (refer to Table 5.1-2) to state that the remainder of groundwater is not a current pathway. Lastly, a risk assessment has not been conducted at this site; therefore, it is presumptive to make the statement that the risk from groundwater plumes is insignificant. Further, there is no basis for the statement that groundwater was more likely a significant pathway to the river historically.
97	Sec 5	Exec Summ	ES5-ii	2	EPA disagrees with the statement that most stormwater discharges entering the river will require an NPDES permit. Currently, only about ¼ of all industrial stormwater discharges within the Study Area are required to have an NPDES permit. Further, it should be noted that stormwater permits do not limit or require monitoring of hazardous substances, except lead, mercury and copper, which are only monitored in the whole water phase of stormwater.
98	Sec 5	Exec Summ	ES5-iii	2	The Report states that about 22 percent of the watershed draining to the river is largely uncharacterized. The draft RI Report should clarify what is meant by "uncharacterized." EPA believes that a much larger portion of the lower Willamette watershed is uncharacterized with respect to flow and chemical concentration.
99	Sec 5	Exec Summ	ES5-iii	2	The Report states that the potential for either stormwater or wastewater to act as a potential pathway to the river was evaluated at 311 outfalls within the Study Area. The draft RI Report should clarify what is meant by "evaluate." For example, Section 4.1.4 of the Report states that approximately 322 outfalls have been identified, but that only 158 outfalls were verified. There seems to be some discrepancy in the number of outfalls. Were 11 outfalls that have been identified not evaluated? If so, why weren't they evaluated? How can LWG evaluate the potential discharge from outfalls if they are unsure of their existence and upland drainage areas?
100	Sec 5	Exec Summ	ES5-iii	2	The Report makes the statement that "... current wastewater discharges are probably a negligible pathway to the river due to regulatory controls." EPA disagrees with this statement. Please see the comment on Sections 3 and 4, above.
101	Sec 5	Exec Summ	ES5-iii	2	The Report states that relatively little [few] riverbank soil data are available. This may be a data gap for recontamination potential and risk. Further, the Report makes the statement that bank erosion may have been more significant historically. See previous comment on this claim. Unless a bank with contamination has been stabilized that was not stabilized in the past, it is unclear why erosion from a contaminated bank would be more problematic historically that today. The contamination still exists, and the potential for erosion still exists.
102	Sec 5	Exec Summ	ES5-iii	2	Atmospheric deposition was only evaluated as direct deposition to the waterway. See previous comment on the need to look at atmospheric deposition more broadly to assist in the evaluation of background conditions. For example work performed by ODEQ suggests that atmospheric deposition of PCBs (e.g., PCB-118) in the upstream reaches of the Willamette River basin also contributes to high levels of PCBs in fish throughout the entire main stem of the Willamette River.

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103	Sec 5	5.1.2	5-7	4	Sites at which groundwater COIs are present above screening levels in both groundwater at the riverbank and in TZW should be identified as having a complete groundwater pathway to the Willamette River. TZW data should be considered in the design of upland source control measures and in-water sediment remediation. See comments on the evaluation of TZW in the human health and ecological risk assessments.
104	Sec 5	5.1.2	General Comment	2	In general, the evaluation of TZW should consider data on the upland groundwater contamination plume and should understand the connection with the river through the groundwater and Transition Zone Water (TZW) samples. Although large scale plume loadings (Table D4-2, for example) based on mean and maximum flows and loadings may be used to evaluate the loading to surface water resulting from contaminated groundwater discharges, this scale is not relevant when looking at effects on the benthic community or uptake by benthic organisms directly exposed to groundwater contamination. The evaluation in the draft RI Report should focus on defining a source area, defining the flow path of the ground water plume and its concentration at different points along that path, and using that information to evaluate the risks associated with TZW.
105	Sec 5	5.1.2	General Comment	2	The ground water discharge zones presented in this section are identified solely based on the locations where TZW measurements were taken. The draft RI Report should include areas where there is the likelihood of groundwater discharge based on the topography, actual data from uplands, data from TZW samples, and even interpretations from sediment characteristics. In general, most of the site should have groundwater discharges to the river based on uplands near the river and porous formations where groundwater flows. The areas where actual measurements were taken can then be separated from those more general discharge zones.
106	Sec 5	5.1.3.1.1	5-8	2	The sources provided in the Report for the development of the drainage maps (Maps 4.1-1a-i) do not provide all information on the upland drainage areas to the river. This should be addressed in the draft RI Report.
107	Sec 5	5.1.3.1.3	5-11	2	The list of COIs to be mapped should be expanded to include additional COIs based on stormwater data collected during Round 3.
108	Sec 5	5.1.3.1.3	5-11	2	This paragraph indicates that mercury, arsenic, total PAHs, total PCBs, total DDT, and BEHP are chemicals suspected to be driving risks in the system. Yet Section 3 states that dioxins, PCBs and DDx are the risk drivers. This discrepancy should be rectified in the RI Report, based on the risk assessment.
109	Sec 5	5.1.3.1.3	5-12	2	Most local and national studies have not focused on industrial stormwater and have not looked at most of the hazardous contaminants associated with the Portland Harbor site or specific upland sites. Within a superfund site, industrial, housekeeping, and disposal practices are equally important. This limits the use of data collected to characterize urban stormwater generally.
110	Sec 5	5.1.3.1.4	5-12	2	It is unclear whether CSOs in Portland have been monitored for all COCs for the Portland Harbor Superfund Site. As noted in the Round 2 Report, data collected by Metro King County suggest that metals, SVOCs and PAHs are present in CSOs. Other chemicals such as PCBs and pesticides may be present as well. As a result, further evaluation of CSOs in Portland Harbor is required. Information regarding contaminant concentrations and the frequency and magnitude of overflows should be collected as part of the upland source control evaluation to develop loading estimates and understand the significance of CSO discharges.
111	Sec 5	5.1.3.1.4	5-12	2	It is unclear why the Report indicates that water loading is more relevant that solids loading from stormwater. This is a key element of the stormwater sampling program. Results from this sampling effort should be used to assess the dissolved phase and particle phase loading from stormwater.
112	Sec 5	5.1.3.1.4	5-13	2	EPA disagrees with the statement that data used for source tracing have little or no value for determining source loads. The concentrations found in source tracing could be used with regional storm records and drainage basin acreage to determine loadings, although there would be greater uncertainty in these loading rates than in those derived from other data.

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113	Sec 5	5.1.3.1.4	5-14	2	While it is ideal to have similar data collected throughout the site to equally represent all discharges, it is an unrealistic expectation, and the data collected should be used to evaluate the discharge from that outfall. The current data collection and extrapolation efforts being conducted through the Round 3 Stormwater investigation should be verified using other data, such as source tracing data, as another line of evidence. Although using different data sources to determine stormwater loading may be difficult, especially when it only represents a portion of the drainage basin, it does not mean that it should not be done. These types of loading would be qualified as potentially under- or over-estimating the true loading. It should be acknowledged that there is uncertainty associated with using partial storm season data at a few sites (30 of 311) and extrapolating these data to the whole storm season, then extrapolating them to other sites, then extrapolating it to multiple years.
114	Sec 5	5.1.3.2	5-14	2	Just because a discharge has an NPDES permit does not mean that the discharge is not impacting sediment quality. This type of evaluation is not included when developing most individual permits, and general permits typically do not include this type of evaluation. The draft RI Report should clarify the statement "Note that multiple permits may be associated with a single outfall."
115	Sec 5	5.1.4	5-16	3	The Report states that relatively little [few] riverbank soil data are available. This is a data gap that must be addressed through upland remedial investigation and source control characterization efforts. As stated previously, unless a bank with contamination has been stabilized that was not stabilized in the past, it is unclear why erosion from a contaminated bank would be more problematic historically that today. The contamination still exists, and the potential for erosion still exists.
116	Sec 5	5.1.6	5-16	2	This section assumes that all overwater releases are spills, although releases from other activities (e.g., operation of boat motors, leaching, etc.) also represent overwater releases.
117	Sec 5	5.1.6	5-17	2	The draft RI Report should specify the regulations and best management practices that are used to control releases from overwater activities, and should provide a discussion of the effectiveness of each regulation and BMP in controlling/reducing contamination to the river.
118	Sec 5	5.1.6	5-17	2	It seems that there are more utility crossings within the study area than one petroleum pipeline. For example, the City of Portland recently installed a new sewer line crossing beneath the Willamette River
119	Sec 5	5.2.2	5-19	2	The draft RI Report should consider the impact of the various TMDLs on contaminant loading to the Portland Harbor site. For example, are these TMDLs sufficient to prevent contamination in river sediments and reduce risk to acceptable levels, or should they be re-evaluated?
120	Sec 5	5.3	5-19,20	3	EPA generally agrees with the statement that "[h]istorical sources within the Study Area likely contribute to the majority of observed chemical distribution in sediments within the Study Area." However, there has been a distinction between historic and current upland sources. We should be clear that many of the current sources to the river are the result of historical releases (e.g., historic discharge of waste to Doane Lake [RPAC] and tar disposal ponds [GASCO]). The focus of source control is to address ongoing sources of contamination to the Willamette River, whether or not a given source is the result of a historic release or a current release.
121	Sec 5	Sec 5 Tables	Table 5.1-2	2	The RI should assume that the conceptual model of discharge from uplands to the river is the starting point to make the pathway connection. Unless there are data to show that there is some special reason why this logical conceptual model is incorrect (e.g., documented reverse gradients, a fully controlling barrier wall system, etc.), all the sites should be assumed to be in direct connection with the river.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
122	Sec 5	Tables	Table 5.1-2	2	General Comments on Table 5.1-2: 1. When linking in-water contamination with upland sources, additional upland sources of contamination may be identified. 2. For Direct Discharge, Stormwater/Wastewater should be separated into 3 categories: stormwater, CSO and wastewater. Many sites may have multiple discharges, with different COIs in each discharge. 3. Riverfront sites should only have overland transport as "d" if no contaminants have been found in upland soils or if all stormwater at the site is collected and conveyed through a storm sewer system. 4. Riverbank Erosion Potentially Complete Pathway can only be a "d" if the site is not adjacent to the river, if the river bank has been armored (need to look at historic as well as current), or if the river bank has been fully characterized and no contaminants exist in the bank material. 5. All pathways should also be evaluated for potential future releases. 6. Overwater Discharges can only be historic if there used to be a dock or overwater structure that no longer exists. Otherwise, there is a current or potential future for release.
123	5	Table 5.1-2	1 of 7	2	ACF Industries – Stormwater/Wastewater: Change pathway complete designation from a to b. Stormwater Historic/Current should be "H, C". Groundwater potentially complete pathway should be "c".
124	5	Table 5.1-2	1 of 7	2	Arkema – Stormwater/Wastewater: Pathway should be designated as H, C. Overland Transport: Change pathway complete designation to likely complete (b). Riverbank erosion: COIs should also include VOCs, SVOCs and other.
125	5	Table 5.1-2	1 of 7	2	Burgard Industrial Park – Boydstun Metals, Portland Blast Media – Stormwater/Wastewater: Pathway should be designated as H,C.
126	5	Table 5.1-2	1 of 7	2	Burgard Industrial Park – Noncontiguous Properties – Groundwater: NAPL designation should be changed to no.
127	5	Table 5.1-2	1 of 7	2	Burgard Industrial Park – NW Pipe and Casing – Groundwater: NAPL designation should be changed to yes with a question mark.
128	5	Table 5.1-2	1 of 7	2	Burgard Industrial Park – Portland Container Repair – Stormwater/Wastewater: COIs should be designated as TPH (?).
129	5	Table 5.1-2	1 of 7	2	Burgard Industrial Park – Schnitzer Steel – Groundwater Pathway: COIs should also include metals. Stormwater Pathway: Change pathway designation to complete (a). Overwater discharges: COIs should also include metals; the current pathway designation should not be qualified as questionable. Riverbank erosion: COIs should include PCBs and metals; pesticides should be qualified with a question mark.
130	5	Table 5.1-2	1 of 7	2	Calbag Metals – Front Ave. – Stormwater Historic/Current should be "H/C". Riverbank Erosion Historic/Current should be "H, C".

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131	5	Table 5.1-2	1 of 7	2	Cascade General (Portland Shipyard) – Stormwater/Wastewater: COIs should also include butyltins and phthalates, pathway compete should be designated as likely complete (b); the current designation should be qualified with a question mark.
132	5	Table 5.1-2	2 of 7	2	City of Portland BES Lab – Groundwater Pathway: The COI list should be expanded to include TPH, PCBs and metals; the pathway should be designated as insufficient information to make a decision; Historic/Current should be "H, C?". Stormwater/Wastewater Pathway: The COI list should include TPH, PCBs and metals; other should be removed. Overwater Discharges: The COI list should be changed from pesticides and herbicides to other. Overland Transport: This pathway should be designated as historic; Historic/Current should be "H?".
133	5	Table 5.1-2	2 of 7	2	Consolidated Metco – Groundwater Pathway: The presence of NAPL should be designated as no. Stormwater/Wastewater Pathway. The current designation should be qualified with a question mark.
134	5	Table 5.1-2	2 of 7	2	Exxon/Mobil Terminal – Groundwater Pathway: The current designation should be qualified with a question mark Overwater Discharges. This pathway should be designated as likely complete (b).
135	5	Table 5.1-2	2 of 7	2	Fred Devine Diving and Salvage – Stormwater Pathway: This pathway should be designated as likely complete (b).
136	5	Table 5.1-2	2 of 7	2	Freightliner TMP – Groundwater Pathway: The NAPL designation should be qualified with a question mark. Stormwater Pathway: This pathway should be designated as likely complete (b).
137	5	Table 5.1-2	2 of 7	2	Freightliner TMP (Parts Plant) – Groundwater Pathway: The NAPL designation should be qualified with a question mark. Stormwater Pathway: This pathway should be designated as likely complete (b).
138	5	Table 5.1-2	2 of 7	2	Front Avenue LP Properties – Stormwater Potentially Complete Pathway should be "b"; Riverbank Erosion Potentially Complete Pathway should be "a".
139	5	Table 5.1-2	2 of 7	2	GASCO – Groundwater Pathway: The COI list should be expanded to include SVOCs and TPH; the pathway should be designated as complete (a). Stormwater Pathway: The COI list should be expanded to include SVOCs and TPH. Overland Transport: The COI list should be the same as that for groundwater and stormwater. The pathway should be designated as complete (a); the pathway is both current and historic; the current designation should be qualified with a question mark. Riverbank Erosion: The COI list should be expanded to include SVOCs and TPH.
140	5	Table 5.1-2	3 of 7	2	GE Decommissioning – Stormwater Historic/Current should be "H, C?".

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141	5	Table 5.1-2	3 of 7	2	Goldendale Aluminum – Groundwater Pathway: This pathway should be designated as incomplete (d). No COIs, current or historical sources are known. Stormwater/Wastewater Pathway: This pathway should be designated as incomplete (d). No COIs, current or historical sources are known.
142	5	Table 5.1-2	3 of 7	2	Gould Electronics/NL Industries – Groundwater COIs – remove all; Groundwater Potentially Complete Pathway should be "d"; Groundwater Historic/Current – remove all.
143	5	Table 5.1-2	3 of 7	2	Gunderson – Groundwater Pathway: PCBs should be eliminated as a COI Stormwater/Wastewater Pathway: This pathway should be designated as complete (a). Riverbank erosion. This pathway should be designated as likely complete (b).
144	5	Table 5.1-2	3 of 7	2	Jefferson Smurfit – Groundwater Pathway. This pathway should be designated as incomplete (d). No COIs, current or historical sources are known. Stormwater/Wastewater Pathway: This pathway should be designated as incomplete (d). No COIs, current or historical sources are known. Riverbank Erosion: This pathway should be designated as incomplete (d). No COIs, current or historical sources are known.
145	5	Table 5.1-2	3 of 7	2	Kinder Morgan Linnton Terminal (GATX) – Stormwater/Wastewater Pathway: The COI list should be expanded to include VOCs, PAHs and TPH. Historic/Current should be "H, C".
146	5	Table 5.1-2	3 of 7	2	Linnton Oil Fire Training Ground – Groundwater Potentially Complete Pathway should be "c", Stormwater Historic/Current should be "H, C?"; Riverbank Erosion Potentially Complete Pathway should be "c".
147	5	Table 5.1-2	3 of 7	2	Linnton Plywood – Groundwater Pathway: This pathway should be designated as incomplete (d). No COIs, current or historical sources are known.
148	5	Table 5.1-2	4 of 7	2	MarCom – North Parcel – The MarCom site should be divided into north and south parcels. The groundwater, stormwater overwater and riverbank erosion pathways should be designated as incomplete. The overland transport pathway should be designated as likely complete. COIs are TPH and metals. The pathway is historical.
149	5	Table 5.1-2	4 of 7	2	MarCom – South Parcel – The overland transport pathway should be designated as current and historical. The riverbank erosion pathway should be designated as current and historical and likely complete (b).

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150	5	Table 5.1-2	4 of 7	2	Marine Finance – Groundwater: The groundwater pathway is incomplete. The list of COIs and historic/current designations should be deleted. Stormwater/Wastewater Pathway: This pathway should be designated as likely complete. The list of COIs should include VOCs, TPH, PAHs, metals and butyltins. The overland transport pathway should be designated as likely complete (b); Historic/Current should be "H?, C?". Riverbank Erosion Historic/Current should be "H, C".
151	5	Table 5.1-2	4 of 7	2	McCall Oil – Stormwater/Wastewater Pathway: This pathway should be designated as likely complete, historic and current; the current pathway should be qualified with a question mark.
152	5	Table 5.1-2	4 of 7	2	McCormick and Baxter – Groundwater Pathway: The current designation should be qualified with a question mark.
153	5	Table 5.1-2	4 of 7	2	Oregon Steel Mills – Groundwater Pathway: This pathway should be designated as likely complete; COIs should include TPH and metals; the pathway is both current and historic. Stormwater/Wastewater Pathway: This pathway should be designated as complete (a) both current and historic.
154	5	Table 5.1-2	4 of 7	2	Owens Corning – Linnton: Groundwater Potentially Complete Pathway should be "c"; Stormwater Historic/Current should be "H, C".
155	5	Table 5.1-2	4 of 7	2	POP – Terminal 1 South – Groundwater Potentially Complete Pathway should be "c"; Stormwater Historic/Current should be "H, C?".
156	5	Table 5.1-2	4 of 7	2	Port of Portland Terminal 2 – Stormwater/Wastewater Pathway: This pathway should be designated as current; the current designation should be qualified with a question mark.
157	5	Table 5.1-2	4 of 7	2	POP – Terminal 4, Auto Storage – Overwater Discharges Potentially Complete Pathway should be "c"; Riverbank Erosion Potentially Complete Pathway should be "c"; Riverbank Erosion Historic/Current should be "H".
158	5	Table 5.1-2	4 of 7	2	Port of Portland Terminal 4, Slip 1 – Groundwater Pathway: This pathway should be designated as incomplete (d). Stormwater/Wastewater: The COI list should be expanded to include VOCs, TPH and phthalates; the pathway should be designated as likely complete (b); the current designation should be qualified with a question mark. Overwater Discharges: This pathway should be designated as likely complete (b); historic and current.
159	5	Table 5.1-2	5 of 7	2	Port of Portland Terminal 4, Slip 3 – Stormwater/Wastewater and Overwater discharges: These pathways should be designated as complete (a). Overwater Discharges Historic/Current should be "H, C?".
160	5	Table 5.1-2	5 of 7	2	PGE Harborton – Groundwater and Stormwater/Wastewater pathways: Both pathways should be designated as incomplete (d), both currently and historically. Groundwater Historic/Current – why H?

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161	5	Table 5.1-2	5 of 7	2	Premier Edible Oils – Stormwater Historic/Current should be "H, C?".
162	5	Table 5.1-2	5 of 7	2	Rhone Poulenc – Stormwater/Wastewater Pathways: The COI list should be expanded to include VOCs, pesticides/herbicides, PCBs, metals and other; the pathway should be designated as complete (a) and current. The overland transport pathway should be designated as incomplete.
163	5	Table 5.1-2	5 of 7	2	RoMar Transportation – Groundwater Pathway: This pathway should be designated as incomplete (d). The stormwater/wastewater pathway should be designated as historic only.
164	5	Table 5.1-2	5 of 7	2	Schnitzer Investment – Doane Lake (Aire Liquide) – Groundwater Historic/Current should be "?"; Stormwater Historic/Current should be "H, C?".
165	5	Table 5.1-2	5 of 7	2	Schnitzer Kittridge – Groundwater Pathway: This pathway should be designated as incomplete (d). Stormwater Historic/Current should be "H, C?".
166	5	Table 5.1-2	5 of 7	2	Shaver Transportation – All pathways should be designated as incomplete (d)
167	5	Table 5.1-2	5 of 7	2	Siltronics – Overland Transport Historic/Current should be "H, C".
168	5	Table 5.1-2	6 of 7	2	ST Services/Shore Terminals – Groundwater Pathway: This pathway should be designated as insufficient information (c). COIs include VOCs and TPH; the pathway is historic and current; the current designation should be qualified with a question mark.
169	5	Table 5.1-2	6 of 7	2	Time Oil – The river mile designation should be 3.5. Stormwater Historic/Current should be "H, C?". Riverbank Erosion Historic Current should be "H?, C?".
170	5	Table 5.1-2	6 of 7	2	Triangle Park – Groundwater Pathway: This pathway should be designated as (c). Overwater Discharge Pathway: This pathway should be designated as likely complete (b). Overwater Discharges Historic/Current should be "H, C?".
171	5	Table 5.1-2	6 of 7	2	Trumbull Asphalt Plant – Stormwater Historic/Current should be "H, C?".
172	5	Table 5.1-2	6 of 7	2	USACE – Portland Moorings – Groundwater COIs should be "1, 3, 7, 10, 11".
173	5	Table 5.1-2	6 of 7	2	Van Waters & Rogers – Groundwater Potentially Complete Pathway should be "d"; Groundwater Historic/Current – remove all; Stormwater Historic/Current should be "H, C?".

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174	5	Table 5.1-2	7 of 7	2	Willamette Cove – Groundwater Historic/Current should be "H, C".
175	5	Table 5.1-2	7 of 7	2	Willbridge Bulk Fuel Facility – Overwater Discharges should be "H, C?".
176	Sec 5	Tables	Table 5.1-4	2	The NPDES permits should present EPA NPDES numbers, since this is how they are tracked nationally and in national databases. State numbers should be retained.
177	Sec 5	Maps	Maps 5.11a-h	2	These maps need to show the source area and extent of all upland groundwater plumes. The evaluation of upland sources is not limited to current sources, but also includes future potential sources.
178	Sec 6	General Comment	N/A	2	The draft RI Report,should present data from different media (sediments, TZW, ground water, biological tests, surface water, stormwater discharges, etc.) in a more streamlined and focused manner (see general comment above). A key focus of the presentation should be to present the relationships between sediment contamination and historic upland discharges, on-going discharges, or smearing from other portions of the river.
179	Sec 6	General Comment	N/A	4	EPA comments on the 2006 Groundwater Pathway Evaluation Report do not appear to be incorporated into the Round 2 Report. For example, there are potential errors in the preparation of the Piper Diagrams and/or Stiff Diagrams, and misleading presentations of the data where data from different locations are combined. These comments should be incorporated into the draft RI Report.
180	Sec 6	6.1	6-2ff	4	23 indicator chemicals were selected. This list is limited and represents only a subset of the COC list, not the complete COPC list. Although the Report notes that the subset was evaluated for the purpose of identifying data gaps, many key chemicals are not included. For example, the only metals selected were arsenic, mercury and zinc. Arsenic and mercury sources within the Portland Harbor site are limited. The draft RI and BRA Reports should present summary figures for a much broader set of indicator chemicals Metals such as chromium, copper, lead, nickel, and possibly cadmium, selenium and silver should be included. Other key chemicals that should be included as indicator chemicals are: Dieldrin, endrin, hexachlorobutadiene, TPH-D, TPH-R, di-n-butyl phthalate and phenol. The relative lack of chemicals selected for presentation in Section 6, especially chemicals such as metals, TPH and pesticides that were detected across the site, limits the usability of the Report. For example, it makes it difficult to link the upland areas with site sediments, and it may prevent the identification of all AOPCs.
181	Sec 6	6.1.1	6-3	3	In general, the presentation of surface sediment data is acceptable. However, the draft RI Report should present the data relative to screening level values (SLVs) and/or site-specific preliminary remediation goals (PRGs). SLVs and/or PRGs should also be depicted on the histograms. Scatter plots would also benefit from SLVs or PRGs.
182	Sec 6	6.1.1	6-3ff	3	As a general comment on Section 6, terms like "relatively low" have little meaning without some comparison to risk-based values, standards and background levels (for naturally occurring chemicals). These metrics should be included in the draft RI Report in order to provide information about the magnitude of the contamination relative to risk-based criteria or naturally occurring background. In addition, the chemical-by-chemical analysis should include discussions of range, median, mean and other statistical measures.

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183	Sec 6	6.1.1	6-3ff	2	The following observations of elevated concentrations of specific chemicals should be included in Section 6.1.1. Note that the concentrations identified for comparison should reflect a screening level concentration. Multipliers (e.g., 10X or 100X) should be applied as appropriate to distinguish areas of elevated concentrations relative to the rest of the Portland Harbor Site. • Zinc: Concentrations above PEC were detected offshore of City of Portland Outfall 48. • TBT: Concentrations above 1000 mg/kg were also detected off-shore of Ridell It should be noted that TBT analysis was performed on a subset of samples. It should also be noted that the highest detections in Swan Island Lagoon were found near the Portland Shipyard. • PCB Aroclors: Detections of total Aroclors were detected above 100 ug/kg offshore of Crawford Street Corporation and the BES water lab, Goldendale aluminum, and RM 9.5 on the east side of the Willamette River, and at Balch Creek Cove, Shaver Transportation, and the Railroad Bridge on the west side of the Willamette River. • PCB Congeners: Areas with elevated concentrations of PCB congeners should be noted, such as Balch Creek, Gunderson, Swan Island Lagoon (Portland Shipyard), Arkema, Willamette Cove, Railroad Bridge (west side), MarCom, Schnitzer and the International Slip and OSM. • Dioxins and Furans: Elevated levels of dioxin and furans were also detected offshore of the Arkema facility, Railroad Bridge, and U.S. Moorings Facility on the west side of the Willamette River, and the Time Oil and OSM facilities on the east side of the Willamette River. • Total DDT: It should be noted that elevated levels of total DDT (greater than 40 ug/kg) extend downstream from the Arkema facility to Multnomah Channel, with levels above 400 ug/kg detected at the Railroad bridge and offshore of the GASCO facility. Other areas with elevated detections of total DDT include Gunderson, International Slip, Port of Portland Terminal 4, Willamette Cove, Swan Island Lagoon, and the Portland Shipyard. • Aldrin: It should be noted that concentrations above 1 ug/kg were detected throughout the Portland Harbor site, with concentrations above 10 ug/kg limited to detections offshore of Gunderson, Arkema, Railroad Bridge, and the GASCO facilities. • Beta-HCH: It should be noted that Beta-HCH was detected above 1 ug/kg throughout the site and at isolated locations such as OSM, GASCO, Railroad Bridge and Swan Island Lagoon.
184	Sec 6	6.1.2.1	6-27	2	RM 11 – 11.7: This section should be expanded to RM 11 – 12.2. Although the discussion in this section generally confirms our evaluation of the Cargill-Lewis Dreyfus (CLD) facility, the discussion should be expanded to include newly collected Round 3A and 3B sediment and biota data, such as the elevated levels of copper detected near the CLD facility. Discussions of PAH and metals detections above screening levels in the vicinity of RM 12 on the west side of the river should also be included. Because of the potential sources identified in this reach of the river, this reach should be folded into the RI/FS as a whole.
185	Sec 6	6.1.2.2	6-27	2	Upriver: The upriver (RM 15.3 to Willamette Falls) discussion should include an evaluation of chemical concentrations detected in this reach of the river. Round 3B data collection efforts and EPA Blue Heron and West Linn paper mills site investigation data should be included in this data analysis. Data collected upstream of Willamette Falls as part of the EPA site investigation should also be included.
186	Sec 6	6.1.2.2	6-28	2	Downtown Corridor: EPA considers the downtown to be the reach of the river upstream of the area being actively investigated by the LWG. This is a reach of the river where sources of contamination are generally being addressed through mechanisms outside of the Portland Harbor RI/FS. These include the Zidell facility, Ross Island Sand and Gravel and City of Portland outfalls. Because sediment sampling has taken place at the CLD and Historic MGP facilities, this reach should be adjusted to RM 12.2 – 15.3.

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187	Sec 6	6.1.2.2	6-28	2	Upper Study Area: Significant sediment, biota and surface water sampling has taken place in this portion of the river. Although this area is upstream of the "Initial Study Area," it is within the active area of investigation. Because of the potential sources identified in this reach of the river, this reach should be folded into the RI/FS as a whole.
188	Sec 6	6.1.2.2	6-29	2	Downstream and Multnomah Channel: These sections should be revised to reflect the additional data collected in the mainstem Willamette River between RM 2.0 and the Columbia Slough, and within the upper portion of Multnomah Channel This data was collected to assess the extent of contamination downstream from the Portland Harbor site.
189	Sec 6	6.1.2.2.1	6-30 – 6-33	2	The evaluation presented in this section should be revised to reflect the purpose of the additional data collection efforts that took place within these reaches during Round 3. The Upriver evaluation should look at upriver concentrations for the purpose of assessing background levels of contamination. The Downstream and Multnomah Channel evaluations should consider the extent of downstream contamination for the purpose of establishing a site boundary. The evaluation of data collected between RM 9.2 and 12.2 should not be included as a separate section, but should rather be folded into the broader nature and extent of contamination section. Finally, the Downstream Corridor evaluation should focus on the identification of potential sources of contamination that have the potential to recontaminate the Portland Harbor site and whether those sources of contamination are being adequately addressed.
190	Sec 6	6.1.2.3	6-33	2	Further evaluation of the riparian soil data is required. EPA expects that riparian soils will achieve sediment cleanup levels established for the Portland Harbor site, as well as risk-based cleanup levels established at upland sites for terrestrial receptors. Source control measures in conjunction with sediment remediation will be required to achieve these cleanup levels.
191	Sec 6	6.1.3	6-34	4	The evaluation presented in this section is described as a preliminary background dataset for use in the "Hill Topping" exercise presented in Section 10. Guidance presented in the latest version of Pro UCL should be consulted to develop a distribution of contaminant levels in upstream reaches for comparison to in-water areas. Samples with elevated detection limits and outliers suggesting a nearby source of contamination should be excluded from this evaluation. The results of the background evaluation could be used to look at non-AOPC data points, evaluate capping material, evaluate MNR, etc.
192	Sec 6	6.1.3	6-34	4	The draft RI Report should include an evaluation of background conditions based on the Round 2 and Round 3 upstream sediment data, as well as other data that meets detection limit requirements. Statistical outliers suggest a nearby source of contamination and should be eliminated. A comparison of site data to background concentrations should be performed, even though; consistent with EPA policy, we will not be screening chemicals against background prior to completing the human health and ecological risk assessments. It would be instructive to look at the channel data, for example, and see how it relates to background. Although for most chemicals, risk-based levels will be above background, this evaluation could be instructive for arsenic, PCBs, DDT, PAHs and dioxin.
193	Sec 6	6.1.4	6-39	2	The Report evaluates temporal changes in sediment data over a 9-year period (since the last large flow events in 1996 – 1997). EPA questions whether sufficient data are available to draw meaningful conclusions. The Report states here and elsewhere that there is significant heterogeneity in the system, and further concludes that the heterogeneity between collocates collected on the same day vs. up to 3000 days apart are no different. EPA believes that small scale heterogeneity overwhelms temporal differences and limits the evaluation of temporal changes in sediment concentration.
194	Sec. 6	6.2.2	General Comment	2	The Report needs to include clear statements of the uncertainty for each major topic of discussion (such as the major ions, variability in COCs concentrations, estimates for the modeled stream flow parameters and results [or conclusions]).

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195	Sec 6	6.2	6-40	2	There is a significant amount of TZW data, but only at nine areas of suspected contamination based on documented upland sources (plus the Siltronic site during independent study). The Round 2 Report then attempts to extrapolate that data interpretation to the rest of the river. The data should only be used for the sites where it was obtained, and only in general make any assumptions about other sites or areas not sampled. The TZW data documents impacts correlated to the upland contamination at all nine sites that were sampled. Attempting to make river-wide conclusions based on those data is not appropriate or acceptable. Any additional extrapolation should be carefully worded, with a disclaimer as to its reliability and its high degree of uncertainty.
196	Sec 6	6.2	6-40ff	2	The TZW data collected during Round 2 was limited in both temporal and spatial scales. There should be more emphasis on doing detailed calculations on those areas, rather than extrapolating to river-wide calculations of loading and discharge.
197	Sec. 6	6.2.2	6-45	2	The draft RI Report should consider using Mn and Fe as tracers of contamination emanating from uplands or unstable geochemistry due to other sediment contamination, not just a curious result that can be ignored because it occurs throughout the river. Note that Mn is not widespread at every site, and is mostly correlated with high concentrations of contamination. For example, note that where all the Mn data are plotted "by site" (as done for OSM in July 21, 2006 Memorandum, Figure 5-9), there are large ranges of values for any one site. Also, if the sites are viewed in more detail, as has been done for BP Bulk Terminal 22T (Source Control Implementation Report July 2006), the elevated Mn concentrations are mostly related to the wells along contamination plumes. This is also true for the GASCO site (2006 Report, Figure A-41) and Christenson Oil site (Figure 4, Second Quarter 2007 Report). Ultimately, the draft RI Report should present a site-by-site analyses, with correlation of other contamination data and with less emphasis on river-wide comparisons.
198	Sec 6	6.2.3	6-52	2	Although the groundwater pathway and TZW evaluation was designed to capture conditions representing maximum groundwater flow to the Willamette River, it is unclear whether this was actually achieved. The interactions between the upland sources, groundwater elevations and gradients toward the river, and precipitation and infiltration are complicated. It is most likely that when the precipitation rates are higher, both the river and the groundwater in the uplands would rise, and that the flow into the TZW areas would also fluctuate (as well as the concentrations of COCs). When water levels rise in the uplands due to precipitation, there may be additional forces which accelerate the flow of groundwater into the flow paths to the river and TZW, and these may be changing depending on how the upland groundwater gradients recover in relation to the river gradients. The draft RI Report should evaluate site data to assess whether the TZW was performed during periods of maximum groundwater flux to the Willamette River.
199	Sec 6	6.3.3.2	6-55,56	2	The Report states that Aroclors were detected in only 4 locations. Text should be clear that this was a direct result of detection limits and that congeners were detected in all samples.
200	Sec 6	6.3.3.2	6-55,56	2	The Report states that differences observed between transects and source samples may be the result of sampling technique. There should be some attempt to link higher levels of congeners at specific locations with potential sources as evidenced by upland or sediment data.
201	Sec 6	6.3.3.3.1	6-58	2	Dioxin/Furan Composition - For Dioxin, the draft RI Report should note the prevalence of tetra homolog at sample location W-015 – RPAC outfall . . . The Report should consult EPA's dioxin source inventory report (EPA/600/P-03-002A – check limitations on use) for matching homolog patterns with source type.
202	Sec 6	6.3.3.5	6-60	2	Aldrin – For Aldrin, the draft RI Report should note the difference in pattern at W-015 and W-016 relative to other stations. All other stations are similar. This comment applies to beta hexachlorocyclohexane (6.3.3.6) and total chlordane (6.3.3.7).
203	Sec 6	6.3.3.8	6-62	2	Benzo(a)pyrene - Again, the draft RI Report should note that the concentrations of B(a)P at source areas (W-15, W-16 and W-18) differ significantly from transects. Data is good for identifying local sources of B(a)P.

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204	Sec 6	6.3.3.10	6-65	2	Hexachlorobenzene - The draft RI Report should note that the pattern for HCB is not nearly so clear as for other pesticides – Aldrin, Lindane and Chlordane.
205	Sec 6	6.3.3.11, 12	6-65	4	Arsenic and Lead: The draft RI Report should include other chemicals if they screen in based on AWQC exceedance. These include copper, zinc, bis(2-ethylhexyl) phthalate, and any other chemicals from Round 3 that screen in.
206	Sec 6	6.4.1	6-67	3	Indicator chemicals should be based initially on the screening-level assessment. Tissue concentrations should be compared to human health and ecological critical tissue values. In general, the HH chemicals are acceptable. Additional chemicals that should be included on the Eco side include chromium and lead.
207	Sec 6	6.4.2	6-69,70	2	It should be noted that with the exception of sculpin and clams, it is difficult to draw too many conclusions regarding the distribution of contamination in biota tissue. Limited conclusions may be made regarding crayfish and smallmouth bass. However, it should be noted that smallmouth bass may range up to one mile and that crayfish exhibit a scavenging behavior that may make it difficult to draw conclusions.
208	Sec. 6	Figures	6.1-1 to 6.1-47	2	The RI should highlight the obvious areas which abruptly deviate from the overall range for every COC and for major tracers or indicators (special contaminants from the site, or major ions such as Mn and Fe). While the plots do show the high areas, that information is presently buried in a large number of figures which hide rather than highlight that information.
209	Sec 7	General Comment	N/A	1	NOTE: This section focuses on three key elements – Loading terms, Fate and Transport processes and the Hybrid model. EPA has provided comments previously on the Hybrid Model. In addition, further work on the fate and transport and Hybrid model are expected to result in a refinement of procedures for evaluating fate and transport processes at the Portland Harbor Site.
210	Sec 7	7.1	7-2	1	Many loading terms will be difficult to quantify accurately. The Report acknowledges this. In addition, historical releases and discharges are not included as loading terms because they are not quantifiable. We agree with this assessment, and would add that historical releases that are ongoing sources – either from uplands or from contaminated sediments – should be included in the overall loading assessment because they are currently impacting the sediments.
211	Sec 7	7.1	7-2	2	Regarding the loading estimates, each section should explain the uncertainty of the data obtained or used; then, when the summaries and conclusions are presented, there should be a clear statement of the uncertainty for that composite picture of data interpretation.
212	Sec 7	7.1.1	7-3	2	The Round 2 Report describes a semi-quantitative approach for developing upstream loading estimates. Round 3 surface water data collected from RM 15, Round 3B sediment trap data, and Round 3B upriver sediment data can be used to develop quantitative loading estimates for both sediment and water in the draft RI Report
213	Sec 7	7.1.1.1.1	7-3	4	Data from RM 11 were used to calculate upstream loading from surface water. For the draft RI, upstream loading from surface water should be estimated based on data collected from RM 15.
214	Sec 7	7.1.1.1.2	7-4	2	Results below detection limits were assigned a zero loading rate. This may not be appropriate for some chemicals. A summary of chemicals assigned a zero loading rate based on non-detected concentrations should be presented in the draft RI Report.

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215	Sec 7	7.1.1.2	7-5	2	Upstream loading is associated with bedload and suspended sediments. Upstream loading is handled qualitatively in this Report. Quantitative estimates will be required. Sediment trap data, upstream surface water, and sediment samples and sediment cores in depositional areas within the upper portion of the site should be used to develop these estimates. Although EPA agrees that contaminated sediments are generally associated with fine grained sediments, additional information should be presented to assess whether bedload is a significant source of upstream contamination. EPA agrees that these estimates will be refined through use of the contaminant fate and transport modeling effort.
216	Sec 7	7.1.1 2	7-6	1	EPA agrees with the conceptual model – narrow channel upriver (upstream of RM 15) and depositional within study area (downstream of RM 10). Downtown reach is fairly narrow; however, the Ross Island area is likely variable in width, with wider reaches just upstream of Ross Island and narrower zones such as Holgate Slough.
217	Sec 7	7.1.2	7-9	2	Estimates of stormwater loading require the following information: Drainage area data, stormwater volume, and chemical concentrations. Loading estimates should be updated based on data being collected by LWG, City of Portland and DEQ at specific upland facilities.
218	Sec 7	7.1.2	7-9	2	Table 4.1-3 should be augmented with information presented in Table 4.1-1 (e.g., site names). Other information regarding stormwater should be included, such as COIs, availability of chemical data, data type (e.g., dissolved water, sediment trap, catch basin sediments, etc), and availability of flow data.
219	Sec 7	7.1.2	7-9	2	The Round 3 sampling effort included a focused effort to characterize stormwater throughout the Portland Harbor site. This information should be used to refine the stormwater evaluation, including loading analyses. In addition the draft RI Report should describe the relationship of the stormwater data collected through the RI/FS and Source Control efforts.
220	Sec 7	7.1.2	7-9	2	EPA encourages LWG to work with DEQ, the City of Portland and the Stormwater Technical group to develop a comprehensive picture of stormwater loadings within Portland Harbor. This information should be folded into the Portland Harbor RI/FS, as appropriate (e.g., loading estimates, recontamination potential).
221	Sec 7	7.1 3	7-16	2	There is no basis to assume that any TZW is an overestimate of actual concentrations or that the results are due to desorption from nearby sediment. The results should be presented "as is," without providing reasons why particular results are too high In many cases this same argument could be used just as readily in the reverse, where the discharge plume in the TZW area was missed and therefore the value is an underestimate.
222	Sec 7	7 1 3	7-16	2	The draft RI Report and chemical fate and transport evaluation should consider contaminated groundwater as an external load and remobilization of contaminated sediments though sediment resuspension and internal load.
223	Sec 7	7.1.3.1	7-18	4	It is inappropriate to use a factor of 10 multiplier of the chronic ecological screening level. The screening should be performed to identify chemicals of potential concern for inclusion in the baseline risk assessment See comments on the ecological risk assessment.
224	Sec 7	7.1.5	7-23	2	Wastewater discharges appear to be limited to nine permitted major discharges. 1500 permits for the discharge of contaminated groundwater associated with petroleum cleanups and 1300J permits associated with oily stormwater should also be considered.
225	Sec 7	7.1.5	7-23	2	An assumption is made that the combined chemical load associated with industrial discharges is "expected to be minor relative to other sources." What information is available to support this assumption?
226	Sec 7	7.1.5	7-23	2	Estimates will be developed for the RI Report based on a review and evaluation of information presented in major NPDES permits. 1500 and 1300J permits should be included in this analysis.

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227	Sec 7	7.1.6	7-24	2	The evaluation of upland soil and riverbank erosion considers two primary mechanisms: 1) erosion of bank soils by river flow and 2) overland runoff – either through stormwater flow or direct overland flow to the river. Other mechanisms are assumed to be negligible – wind erosion, construction, animal and other human activities, etc. The Report states that construction is expected to be limited because it is regulated through 1200 C permits. However, construction or cleanup activities (i.e., excavation activities) in areas of highly contaminated soil could be significant and will need to be managed in some fashion.
228	Sec 7	7.1.6	7-24	2	Qualitative information is available to support this evaluation, such as the presence or absence of stabilizing material such as vegetation and riprap, and the configuration of the bank (steepness, soil type, presence of structures). Analysis of bank conditions concludes that 50% of the riverbank is susceptible to erosion. Bank chemistry data are available at 11 sites, including some of the most contaminated sites such as GASCO, OSM, Arkema, Gunderson and MarCom.
229	Sec 7	7.1.6	7-24	2	The Report states that due to the lack of data and information about erosion rates, it is not possible to develop loading estimates for bank erosion, that "the data to understand these localized sources will need to be evaluated as a part of the remedial design process for each sediment management area" and "bank erosion and chemistry data will need to be collected by individual property owners under the direction of DEQ," and that is "assumed that potential bank erosion sources will be controlled before remedial action occurs." EPA agrees generally with this statement. However, it is critical that bank soils are remediated to levels that are protective of in-water receptors, either through source control effort or sediment remediation.
230	Sec 7	7.2.1	7-29	4	Data Sources: STA, SPI, bathymetric surveys, sediment stakes, ADCP, sediment data, TSS, settling velocity, erosion rates. A significant amount of effort has been put into assessing the physical fate and transport processes, but much less into assessing the chemical processes – e.g., biodegradation and chemical transformation. For many chemicals at the site (e.g., metals, PAHs, PCBs, chlorinated pesticides and chlorinated dibenzo dioxins and furans), chemical and biological degradation are expected to be very slow, variable throughout the site, and may result in the formation of chemicals that are also toxic. In addition, literature values for chemical and biological degradation are variable and may not apply to the Portland Harbor Site. As a result, the draft RI Report should assume that chemical and biological degradation do not occur for the aforementioned chemicals to a significant degree, and that physical processes (e.g., burial) are the key factors in assessing monitored natural recovery (MNR).
231	Sec 7	7.2.1	7-29	1	Porewater Physical Processes -This section covers physical processes such as advective and diffusive transport. The Report states that a groundwater discharge rate of 6.2 cfs was calculated for groundwater transport throughout the study area. Calculations are shown in Appendix D. EPA comments are presented in our comments on Appendix D, below.
232	Sec 7	7.2.1.3	7-38	2	The RI should concentrate on presenting the data obtained, separate from any extrapolations. Note, for example, the following statement – "A total groundwater discharge rate of 6.6 cfs through sediments over the entire Study Area was conservatively estimated using hydrogeologic data from the CSMs and Darcy's Law (see Appendix D.4.2 for calculations). This discharge was assumed to occur uniformly over the entire sediment bed in the Study Area ...". Although this type of evaluation may be used as a bounding exercise, this type of presentation is not particularly useful to determine what sites need to be cleaned, or whether the problem is from TZW or sediments along the river.
233	Sec 8	N/A	N/A	1	Note: EPA has not provided comments on Section 8. Rather EPA focused its review on Appendix F. Comments on Appendix F should be incorporated into the baseline human health risk assessment. See below for EPA comments on Appendix F.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
234	Sec 9	N/A	N/A	1	Note: EPA has not provided comments on Section 9. Rather EPA focused its review on Appendix G. Comments on Appendix G should be incorporated into the baseline ecological risk assessment. See below for EPA comments on Appendix G.
235	Maps	Various	N/A	2	There seems to be a lack of incorporating multiple sets of data into areas in maps. It would be helpful to have areas show multiple datasets (concentrations for sediment, TZW, ground water plumes, stormwater discharges, biological data and surface water) in one composite map. It does not need to be an entire set of maps, but perhaps mapping a few selected COCs would do much to show the interaction of all the sources and contaminants in an area. It would be good to have some of the worst areas (GASCO to Arkema) as well as some of the less contaminated or clearly understood areas.
236	App A	General Comment	N/A	2	The database should be updated with Round 3 data, assessed for overall accuracy, in the draft RI Report. EPA expects that the database is accurate, but a description of the procedures utilized to ensure accuracy and completeness should be presented.
237	App D	2.0	D-3ff		The Round 2 Report presents a semi-quantitative upriver loading analysis. EPA recommends a more quantitative analysis. See comments on Section 7.1.1.
238	App D	3.0	D-5ff	2	Stormwater Loading Estimates: The stormwater technical team is working on an approach for estimating stormwater loading using the Round 3 stormwater data. The approach developed through this process should be incorporated into the draft RI Report.
239	App D	4.2.1.4	D-25	2	Overall it seems that the equations and calculations used to estimate the mass loadings from groundwater or TZW to the surface water are correct. One exception is in this section, where it seems the equation is missing a factor of 10^{-9} (kg/ug). However, this brings up a potential problem: where statements or equations are presented in multiple places, the chances are increased that errors will be introduced. I suggest that the logic, equations, and basic factors for the RI be developed in one section, with all the necessary details and references, and then either copied directly or referenced in following discussions of the same issue.
240	App D	4.2.1.4	D-25	2	Calculations of K_{oc} should not be estimated across the site based on the few selected TZW and sediment samples. Any data that are presented should be separated into actual datasets from samples and into calculated datasets. An estimate of the uncertainty associated with each dataset should be presented. Mixing field data with extrapolated data for a much larger area is not supported by the TZW dataset available for this site.
241	App D	5.0	D-27ff	4	Atmospheric Deposition: Because atmospheric deposition only looks at direct deposition to surface water, this is unlikely to be a significant pathway. Atmospheric deposition to the watershed (either locally within Portland or regionally through the entire watershed) is far more significant. This component is being addressed through upstream loading and stormwater loading. However, non-point sources not associated with atmospheric deposition will be easier to control than atmospheric deposition. The draft RI Report should estimate the amount associated with atmospheric deposition that cannot be controlled through agency source control efforts.
242	App D	5.0	D-27ff	2	River Bank erosion: Large areas of the river bank are uncharacterized. Characterization of riverbank soils is typically being performed as part of the upland source control investigations. Although it is acceptable to not consider the loading associated with bank erosion quantitatively, EPA expects that bank soils will achieve acceptable levels for sediment.

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243	App D & Sec. 7	7.2.1 7.2.1.1.2.	D-40 plus 7-30 plus	2	Significant effort is spent in this appendix attempting to explain why arsenic, barium and manganese are found in high concentrations in TZW at all nine sites where this type of sampling was done. Rather than explaining the concentrations away as representing background conditions, the draft RI Report should concentrate on documenting where these are found, and should spend more effort attempting to develop a correlation between the uplands contamination and how those contaminants affect the concentration of these minerals. Note that even within the riverfront area of a site, the concentrations can vary considerably, most probably due to other factors which affect the dissolution of these minerals. The RI should concentrate on comparing the available data – both in the upland sites and in the river – with these minerals. It should also attempt to compare the concentrations of these minerals with "non-contaminated" areas, even if the data available only allow that to be done within each single TZW sampling area. The data should present what is in the sediment, uplands groundwater plumes, and TZW, without bringing in interpretations of why that may be due to microbiological activity, or because the metal or mineral has unusual properties (As), or how it should be diluted from what was detected because of some assumed hydrological impact. Please present the actual data (with maps and graphs) without any of the additional interpretations or changes in the front of the RI, then any calculations and arguments in a separate section, but only if absolutely necessary. Much of the material presented in the Round 2 Report is a mixture of data and interpretations which may be considered biased, but which, in this presentation, are hard to separate from each other without a major effort.
244	App D	Figures	N/A	2	Many of the figures plot TZW vs. another contaminant (TPH, PAH, etc.). This may be a more worthwhile exercise if done for the plumes in the uplands, where something like PAH can be more easily detected in a reasonable concentration to make the case for interactions. Since the values in the TZW are rather dilute for any chemistry comparisons, it may be misleading to attempt such interpretations.
245	App D	Table D4-3		2	This table is a good start, but should be updated with all the more recent information on upland sites, including the correlations mentioned in other comments between sources and contaminant plumes and other factors (such as major ions, arsenic, manganese, iron, barium, etc., which are useful to understand the relationship of upland contamination to the river contamination).
246	App E	General	N/A	1	Comments on Appendix E will be delivered at a later date.
247	App F	General	N/A	2	The draft RI and BRA Reports will need to incorporate Round 3 data into the HHRA for all exposure media both for the screening for COPCs and for the Risk Characterization for the RI HHRA. This effort should be straightforward for most datasets. The one issue that might be of concern is whether Round 1 and Round 3 biota data are similar enough to be combined when calculating site-wide EPCs, and whether this decision will need to be made using some type of statistical analysis.
248	App F	General	N/A	4	The uncertainty section of the Round 2 HHRA states that "additional evaluation of the method used to estimate non-detects may be warranted" in those cases where the detection limits were above ACGs and the chemical was detected infrequently. The latest version of Pro UCL (Version 4) recommends using statistical techniques to deal with non-detects, as opposed to assuming that non-detects are equal to ½ the detection limit, as was done in the Round 2 HHRA Rather than performing additional analysis on a subset of the data as discussed in the uncertainty section, all calculations for all data should be done using the statistical methods recommended in Pro UCL Version 4 for dealing with non-detected values. Non-detected values that are greater than the maximum detected value for a given dataset should not be included in the EPC calculations. Rather, these values should be included in separate tables and discussed as a part of the uncertainty section.

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249	App F	General	N/A	2	A 95% UCL on the mean was calculated for chemicals in most media/biota when 5 or more samples were available. The maximum value was used if fewer (1 – 4) samples were available. In comments sent to the LWG on several HH technical documents, EPA expressed concern about using so few (5 -10) samples to calculate a 95% UCL on the mean for the EPC. EPA is still concerned about this. Therefore, in the uncertainty section, biota EPCs that were calculated using less than 10 samples should be listed in a table by species, location, body type, and chemical. An uncertainty analysis should be included for the major COCs for each scenario/media/biota type that demonstrates how the EPC for each of these samples would differ if the maximum detected values were used for the EPC, rather than the 95% UCL on the mean.
250	App F	General	N/A	2	The uncertainty section of the Round 2 HHRA states that for biota, "where use of the maximum concentration suggests a potential for unacceptable risks, additional evaluation of the concentration used to represent exposure may be warranted." However, it is not clear what type of evaluation is being referred to. The latest Pro UCL guidance and other EPA guidance should be reviewed to determine the acceptable minimum number of samples needed to calculate a 95% UCL on the mean. See also the general comment on calculation of 95% UCL for small datasets.
251	App F	General	N/A	4	Willamette River surface water should be considered a potential future drinking water source. For assessing surface water (SW) as a drinking water source, surface water should be screened against MCLs and EPA Region 6 tapwater PRGs using max values from each sampling site using only integrated water data. The COPCs selected should be evaluated for a drinking water scenario for trespassers, workers, and residents, and for inadvertent ingestion from swimming for recreational users. Vertically integrated and transect surface water data should be used; near bottom samples should not be included. A site-wide average concentration should be generated.
252	App F	General	N/A	4	It is unclear whether the maximum consumption rate for shellfish assumed in the risk assessment (18 g/day which is a little more than 1 pound per month (one pound in 3.6 weeks)) is sustainable at some or all of the areas where bivalves were collected, now or in the future. EPA believes that sufficient information exists to support the clam consumption scenario. However, EPA acknowledges that an appropriate exposure area should be determined in consideration of water depth (i.e., nearshore areas) and the area over which a sustainable shellfish harvest consistent with the clam consumption is possible. EPA proposes that the EPC for clams only (not crayfish) be calculated by combining clam composites from approximately 1 mile on each side of the river. EPA proposes that the selection of composites to be used for calculating each EPC be done jointly by EPA and LWG. EPA also cautions that although 1 mile will serve as the starting point for forming composites, best professional judgment should be used in combining composites that are on the boundaries of these 1-mile segments, especially those that have the potential to be impacted by a given source.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
253	App F	General	N/A	4	The HHRA in the Round 2 Report includes a risk characterization for the integrated SW samples, assuming ingestion of SW as a drinking water source by transients and through inadvertent ingestion by recreational users during swimming. Additional evaluations of SW and all of the TZW evaluations are done in a separate section (Section 6, *Screening of Surface and Transition Zone Water Data)* of Appendix F. EPA does not agree with much of the evaluation done in Section 6. The following changes should be made for Appendix F and included in Section 8. Also, alternative flowcharts for SW and TZW are attached (Attachment 1) and should be included in the HHRA: SW as a Drinking Water Source – Scenarios that evaluate the risk from drinking surface water for workers and residents should be added to the CSM and to the RI baseline HHRA. These evaluations can be done using integrated SW samples to identify COPCs. Region 6 screening levels should be used in place of the tap water PRGs from Region 9 (for non-cancer screening levels assume an HI= 0.1). SW as a Source of Contaminants in Biota – This evaluation should be included in the baseline risk assessment/risk characterization. The maximum concentration of a chemical from all SW data (including near bottom samples) should be used and screened against WQC, based upon an ingestion rate of 175 g/day (not 17.5 g/day). For those COPCs selected (all should be listed in the narrative), the sample-specific water data should be compared to co-located biota data. If these COPCS are identified as COCs in the co-located biota data, the biota data may be used for evaluating the SW COPCs from this sampling area. If a COPC is not a COC in co-located biota or if co-located biota data are not available for a SW sampling location, these chemicals should remain as COPCs, identified as a possible data gap for site-specific remediation and source control, and discussed in the uncertainty section. TZW as a Source to Surface Water to Be Used as a Drinking Water Source – The screening evaluation done in Section 6 should remain in Section 6 rather than be included in the baseline risk assessment and risk characterization, and Region 6 screening levels should be used in place of the tap water PRGs from Region 9 (assume HI=0.1 for non-cancer). However, the maximum value from all TZW data, including that from deeper depths (e.g., 90 cm), should used in the screening. The results from the loading estimates and models in Appendix D that are discussed in Section 6 to estimate SW concentrations from TZW COPCS will be reviewed as part of Appendix D. The conclusions based on the Appendix D review will be incorporated into Section 6. TZW as a Source of Contaminants in Biota – This evaluation should be included in the baseline risk assessment/risk characterization. The maximum value from all TZW data, including that from deeper depths (e.g., 90 cm), should be screened against WQC based upon a consumption rate of 17.5 g/day. EPA does not agree with the analyses in Sections 6.2.1.2 (Derivation of HH WQC) or Section 6.2.1.3 (Applying Adjustment Factors to Screening of TZW Data Against HH AWQC). The specific page-by-page comments that follow include more in-depth comments on these 2 sections. The following should be done for COPCS that are identified for TZW as a source of contaminants to biota: (1) TZW COPCs that were not analyzed for in biota (e.g., VOCs and cyanide) should be discussed qualitatively, including the uncertainties; remain as COPCs; and should be identified as potential data gaps for site-specific remediation and source control. (2) For those TZW COPCs that were analyzed for in shellfish, the sample-specific water data should be compared to co-located biota data. If these COPCs are identified as COCs in the co-located clam and crayfish data, the biota data may be used for evaluating the TZW COPCs from this sampling area. If a COPC is not a COC in co-located biota or if co-located biota data are not available for a SW sampling location, these chemicals should be remain as COPCs, identified as a possible data gap for site-specific remediation and source control, and discussed in the uncertainty section. All COPCS identified in TZW and SW in all four of the screenings above should be retained for the RI/FS. In addition, the narrative should include a list of all of the COPCs selected in the initial screen. The CSM should be reviewed to ensure that any needed modifications that might result from evaluation of SW and TZW in the HHRA be incorporated.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
254	App F	General	N/A	4	Diver Scenario – EPA has developed and transmitted a diver exposure scenario to LWG. This exposure scenario should be utilized in the HHRA.
255	App F	General	N/A	5	Further discussion between EPA and LWG is required regarding how to incorporate a breast milk exposure scenario into the baseline human health risk assessment.
256	App F	General	N/A	3	The HHRA should avoid use of language that is judgmental unless there are data to support the language. In particular, some statements made concerning the exposure assumptions should be reconsidered.
257	App F	General	N/A	4	Region 10 EPA as well as the PH JSCS now use Region 6 screening levels for screening, as Region 9 PRGs are no longer updated. Region 6 screening levels should be used for screening for all media in the HHRA (e.g., beaches, in-water sediments, water media) and in Section 6. The non-cancer screening levels would still be divided by 10.
258	App F	1.1	1	2	Add groundwater (GW) and transition zone water (TZW) to the second sentence in this subsection, after "surface water" and before "or biota" – or at least mention analysis.
259	App	2.1	2	2	EPA agreed to evaluation of surface sediments only. However, subsurface sediment should be evaluated in areas subject to erosion below the depth of the surface interval and as an external loading term in the contaminant fate and transport model.
260	App F	2.1.1	4	2	Regarding future land use of beaches, it should be noted that current conditions could change and additional risk evaluations may be required (such as evaluating beach areas that are currently restricted, as well as the seeps from these beaches [recreational only]). This should be added to the HHRA and addressed through institutional controls such as land use restrictions that are evaluated in the FS and, if required, the 5-year review process.
261	App F	2.1.3	5	2	More discussion is needed as to how the SW sample types summarized in the second paragraph of this section correspond to the map of the SW station locations (map 6.3-1). It's not clear how the different sampling regimes (e.g., peristaltic pump versus XAD and integrated versus near-bottom) match up with amphibian habitat, beaches, and human use areas. The numbers of samples given in the second paragraph also do not seem to match up exactly with the map.
262	App F	2.1.3	5	2	The statement is made that "All Round 2 surface water data were included in the Round 2 HHRA dataset." However, on page 28, Section 3.4.3 states that "the near bottom samples are not representative of potential human exposures to surface water, which would occur mostly at the water surface and through the water column. As a result, only integrated water column data were used in estimating the surface water EPCs." Section 2.1.3 should include the statement made in Section 3.4.3 that not all water samples results were used. (Also see comments on Tables 2-10 and 6-1 and on Page 14, Section 2.4.2).
263	App F	2.1.6	8	3	Modify the following, "Depuration is a common method for cleansing shellfish that is ~~typically~~ sometimes done prior to human consumption to eliminate the sediment present in the gastrointestinal (GI) tract of the shellfish. The field collected clams were not depurated prior to analysis, and the data could be biased towards either under- or over-predicting human health risks from this exposure pathway for those consumers who depurate before consuming." Since BSAFs for several important COPCs are likely to be greater than or equal to one, the conclusion that depuration would reduce concentrations is incorrect. More definitive language can be included based on the results of the Round 3 clam analyses.
264	App F	2.1.7	8	2	TZW data should be added to this section, as they will be used in the risk characterization/ uncertainty analyses. In addition, it should be made clear which TZW samples are being used (e.g., data from all depths [e.g., including that from 30 cm[and unfiltered sample results).

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265	App F	2.2.3	10	2	TZW data are screened in an analysis separate from the Round 2 HHRA (Section 6). It is not clear if the max value of all of the TZW data was used (i.e., filtered or un-filtered). The dataset used should be discussed here and in Section 6.2.
266	App F	2.2.3	10	2	Region 9 soil PRGs were used for screening beaches (residential PRGs for recreational, transients, and fishing exposure areas, and industrial PRGs for industrial exposure areas) and in-water sediments (industrial PRGs). Region 9 tapwater PRGs were used for screening surface water and groundwater seeps. Region 10 EPA as well as the PH JSCS now use Region 6 screening levels for screening, as Region 9 PRGs are no longer updated. Region 6 screening levels should be used for screening in the HHRA. The non-cancer PRGs would still be divided by 10.
267	App F	2.2.3	10	2	In the risk characterization, the risks from the sum of total carcinogenic PAHs should be calculated and added to the tables. This summing should be discussed in this section, as this is similar to the TEQ summing.
268	App F	2.4.2	14	4	Discussion of identification of COPCs for RA for SW. See previous comment on the need to evaluate surface water as a residential/occupational drinking water source to be evaluated quantitatively in the HHRA.
269	App F	3.1	16	2	A statement should be added that the exposure assumptions assume that future land use will be the same as current land use; therefore, the risks characterized are based only on current use. If use changes in the future, exposures and risk may also change.
270	App F	3.1	17	4	The HHRA should address the diver and breast milk scenarios, as described in the general comments above.
271	App F	3.3.1.1	19	3	Delete the words "to non-existent."
272	App F	3.3.2.1	21	3	Remove the following, "These activities generally occur infrequently."
273	App F	3.3.3		2	Change "However, contact with surface water would generally be unintentional and infrequent with the possible exception of transients and recreational beach users" to "Two populations expected to potentially have the most frequent contact with surface water are transients and recreational beach users."
274	App F	3.3.3.1	22	3	Remove the following, "however, there is no evidence that this actually occurs."
275	App F	3.3.5.2	23	3	After "However, other species may also be consumed" add "For example, in a survey done by the Linnton Community Center, transients were asked about their consumption of fish or shellfish from the Willamette River. These transients reported consuming a large variety of fish, as well as crayfish and clams, and several transients said they ate whatever they could catch themselves or get from other fishers."
276	App F	3.3.6	23	3	There are no data provided to support the following statement, "However, the available shellfish biomass at locations where shellfish have been found and collected are not sufficient to support ongoing human consumption." Assumptions on available biomass should consider both current use of the site as well as future use, assuming that habitat for shellfish may improve and that remediation of the site may increase public confidence in consuming bivalves For evaluating current exposure, EPA will accept the use of a larger exposure area to collect sufficient biomass (see comment on page 70).
277	App F	3.3.6.1	23	3	Much of the language in this paragraph should be removed, and the information from the Linnton survey of transients showing that transients consume both crayfish and clams should be added.
278	App F	3.4.1	25	2	The general statement that sampling was not random and therefore is biased high is not supported in all cases Bias probably exists for most COPCs for the site as a whole, but may be minimal for smaller exposure areas considered within the site for the HHRA.
279	App F	3.4.1.1, 3.4.1.2	26	2	Calculation of a 95% UCL on the mean using a minimum of 5 samples is an issue for in-water sediments for several chemicals at several ½ river miles. As stated in the general comment above, areas with less than the Pro UCL recommended 8 – 10 samples should be identified.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
280	App F	3.4.3.2	28	3	For recreational exposures, the LWG used only data from the low water sampling event in 2005 to calculate EPCs for the Round 2 HHRA rather than from all SW sampling events. EPA had agreed to this in the technical documents. However, to show that this is not a major issue, it should be discussed in the uncertainty section using a discussion similar to the following: *Transient exposure can occur throughout the year, so data from three sample collection times were used. Arsenic was the only chemical screened in for this pathway. Table 3-5 shows the site-wide average surface water concentration for the three sampling events as 0.48 ug/L. Table 3-6 shows the arsenic surface water concentration for the summer sampling event (site-wide average) as 0.55 ug/L. Given the similarity of the results, it is acceptable to use the summer value for swimming exposure.*
281	App F	3.4.5	30	2	Please provide the data and evaluation to support this statement: "the biomass available at a given location was generally not sufficient to support ongoing human consumption." Note that EPA has proposed developing exposure point concentrations for shellfish over a 1-mile reach of the river to ensure that sufficient biomass is available to support ongoing human consumption.
282	App F	3.4.5	30	3	Delete the following statement, "While it is unlikely that fish from only one river mile would be consumed over a lifetime,..."
283	App F	3.5.1.5	34	2	The three fisher names (Non-tribal recreational fishers, Native American fisher, and Non-tribal Non-recreational fisher) are very confusing. In previous documents they were Recreational, Native American fisher, and Non-tribal fisher (not much better). We may want to think of some other names to distinguish these groups.
284	App F	3.5.1.5	34	2	In the tables where beach sediments are being evaluated (as opposed to in-water sediments), it would be useful to label the tables as beach sediments (instead of just sediments).
285	App F	3.5.1.5	35	2	It is worth noting in the text that there is a fish advisory for PH now. However, some language should be added to make it clear that fish advisories are often not heeded. Also, we are interested in potential future fish exposures assuming that the advisories can be lifted.
286	App F	3.5.1.5	35	3	In the 2nd paragraph under non-tribal fish consumption, the sentence, "Shellfish consumption is evaluated separately in this Round 2 HHRA, so using ingestion rates that include shellfish to evaluate fish consumption is overly conservative" is incorrect. Separate evaluation simply produces two numbers that provide some idea of the range of possibilities for exposure and risk. The important issue is that in defining cleanup criteria, PRGs will be developed separately for fish and shellfish.
287	App F	3.5.1.5	35	3	In the last paragraph on this page, the second, third, fourth and last sentences are statements as to why the 17.5 g/day and 142 g/day are overly conservative for non-tribal fishers. These statements should be removed. The uncertainties concerning fish consumption rates should be dealt with in the uncertainty section and should include not only why these rates may be conservative but why they may be non-conservative as well. (See suggested language in uncertainty section comments.)
288	App F	3.5.1.5	37	3	The following two sentences should be removed, "The CRITFC Study reported that none of the respondents fished the Willamette River for resident species and at most, approximately 4 percent fished the Willamette River for anadromous species. Therefore, the use of this parameter represents a very conservative assumption for this exposure pathway."

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289	App F	3.5.1.5	37	3	The following language should be included to accurately reflect the importance of the Willamette River to the tribal fishery in relationship to the Portland Harbor Site: *"For thousands of years, the Willamette River has been an important ceremonial and subsistence fishery (i.e., salmon, lamprey, and sturgeon) for Native American tribes of the region. Native Americans continue to rely on the Willamette River for subsistence. For example, tribal members conduct a ceremonial spring Chinook fishery and continue to harvest lamprey at Willamette Falls annually.* *Because Willamette Falls is the last viable source of lamprey in the basin, the annual lamprey harvest is of critical importance to the tribes. Therefore, cleanup and restoration measures will need to be managed for maximum use by tribal fisheries and to meet their ceremonial and subsistence needs for lamprey and spring Chinook."*
290	App F	3.5.1.5	37	2	The last paragraph suggests that "the ingestion rate for salmonids is 67 g/d". It would be more appropriate to use the words "anadromous salmonids." The 67 g/d does not include trout, which are also listed in the table.
291	App F	3.5.1.5	38	3	The language on the conservative character of the shellfish ingestion rates in the two sentences beginning with, "Again, Portland Harbor..." and issues related to biomass should be removed. Uncertainties should be discussed in the uncertainty section.
292	App F	3.5.2.1	39	2	The first paragraph on this page discusses the use of the assumption that 10% of the total arsenic in fish is inorganic. The fact that shellfish may have a higher percentage of inorganic arsenic should be briefly discussed here (referring to the Duwamish data), and readers should be referred to the uncertainty section for the analysis previously sent to us by Laura Kennedy for shellfish.
293	App F	3.5.2.2	39	2	Include more explanation in Section 3.5.2.2 as to how chemicals without absorption factors were treated. Also, the lack of dermal adsorption factors for some chemicals should be addressed in Section 7.2.2 1 of the uncertainty section, Exposure Parameters for Sediment Exposure Scenarios.
294	App F	4.6	44	2	The latest Toxicity Equivalence Factors (TEFs) for chlorinated dioxins/furans and dioxin-like PCBs should be used (see Table 2-6 comments).
295	App F	4.6	44	2	A discussion of carcinogenic PAHs and their Relative Potency Factors should be added to this section. For the risk characterization of carcinogenic PAHs, the total risk from these compounds should be added and included as a separate line in the Risk Characterization tables. In addition the EPC tables should include a line that shows the total TEQs from the sum of the chlorinated dioxins/furans and dioxin-like PCB congeners. The Risk characterization tables should include the total risk from Dioxin-like PCB congeners and dioxin/furan congeners. These results may be important in determining if remedial goals are needed for protection of human health for carcinogenic PAHs and total TEQ.
296	App F	5.0	46	2	Remove the words "upper-bound" before the word "probability," as some of the slope factors are maximum likelihood estimates.
297	App F	5.1.1	46	2	Before endpoint-specific HIs are calculated for the HHRA, LWG should submit a brief tech memo that describes the endpoint(s) that will be used for each chemical and which chemicals will be summed. Please compare the chemical-specific endpoints selected to those in Table 5-2 of the Region 10 EPA Columbia River Basin Fish Contaminant Survey Report, and explain any differences
298	App F	5.1.2	47	3	Replace the words "estimated upper bound" with "health protective estimate" in the first line of this page.
299	App F	5.1.3	47	2	For those chemicals that were analyzed by more than one method, it would be useful to list the analytical methods used for each chemical and discuss why the EPC from a particular method was chosen.

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300	App F	5.2.3	55	4	Additional scenarios need to be added to reflect drinking water exposure for workers and for residents added to the HHRA.
302	App F	5.2.5.1	57	3	The following sentence should be removed: " For participants of the CRITFC Fish Consumption Study none fished the Willamette River for resident species and at most, approximately 4 percent fished the Willamette River for anadromous species," for reasons given in Page 37, Section 3.5.1.5 comment.
303	App F	5.2.5.2	59	2	For child consumption, the high end of the fish tissue range should be an HI of 1000 from carp, not 900 from bass.
304	App F	5.2.5.3	59	2	This section, Upstream Fish Consumption, should be deleted, as should Attachment F1. Possibly some comparison of "background" sediments to site sediments could be included here to demonstrate the point that since sediments from areas that are considered "background" for the PH site are contaminated (although at much lower levels), fish would also expected to be contaminated at much lower levels. This language should be discussed with EPA before including it in the HHRA.
305	App F	5.2.6	60	2	The uncertainty that several clam samples were not analyzed for all chemicals should be added to this section. For example, there are no data on chlorinated dioxins/furans or dioxin-like PCB for the clam samples collected off of Arkema, the site which had the highest values for these contaminants in other species (sculpin and crayfish).

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306	App F	5.2.8.3	62-3	2	The maximum detected concentration of lead in shellfish is 1320 ug/kg, which is above the level of concern (700 ug/kg) calculated for the Columbia River Basin Fish Contaminant Study. This section should list those clam and crayfish composites that are above the 700 ug/kg value. In addition, it would be useful to see a comparison of the 95% UCL on the mean to the value of 700. The equation for $z = \ln(10) - \ln(PbBf)/\ln(GSD)$ is quoted from the CRITFC document. The correct form of the equation should be: $z = [\ln(10) - \ln(PbBf)]/\ln(GSD)$ This is likely a typo in both documents, and not a calculation error. Rather than say that the probability is calculated using the z value, it would be more helpful to include the equation in the Round 2 Report using the normal probability function (and assuming that the data are normal after a log transformation): $p=\Phi z[(\ln(10)-\ln(PbBf))/(\ln(GSD)]$ Because this is the probability of the fetal blood lead level being equal to or greater than 10 ug/dl, the probability of fetal blood lead level being less than 10 ug/dl is $p' = 1 - p$ Alternatively, the probability could be calculated directly as: $p'=\Phi z[(\ln(PbBf)-\ln(10))/(\ln(GSD)]$
307	App F	5.3	64	3	The sentence starting with, "As a result, the iCOCs include chemicals ...." should be deleted. It does not provide any useful information and uses judgmental language (i.e., "infrequently", "relatively low risks", highly uncertain"). Also, given a site like PH with multiple sources of contamination, the term "infrequent' has little meaning.
308	App F	6.0	65	2	The majority of this section should be moved to the main body of the HHRA. EPA comments on Section 6 below should be incorporated into the applicable sections of the HHRA.
309	App F	6.0	65	4	EPA did not agree to limit screening of TZW and SW for only those chemicals with a detection frequency greater than 5%. Given the limited sampling locations, the number of different types of sources at the site, and the possibility for localized areas of media contamination, eliminating chemicals of concern based upon a low frequency of detection is not supportable.
310	App F	6.0	65-6	2	For Sections 6.1.1 and 6.2.1, each chemical that fails the screening against WQC should be retained as an iCOC, rather than eliminating those that have been identified as iCOCs for fish or shellfish.
311	App F	6.0	65	3	Remove the last three sentences in the first paragraph, beginning with "This section presents..."and ending with "for these exposure pathways."

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
312	App F	6.1.1	65	2	Screening of SW Data for the Biota Consumption Pathway – Add the following sentence at the end of the first paragraph: "However, in some instances, biota data may not be available from all areas where surface water is potentially contaminated."
313	App F	6.1.1	66	4	SW data were screened against the WQC based upon a fish consumption rate of 17.5 g/day. EPA directed the LWG to screen SW against WQC based upon 175 g/day.
314	App F	6.1.1	66	2	Screening SW against WQC – To the end of the last sentence in the first paragraph (beginning with "If the chemical was detected in tissue…), add the following (after "to derive the human health WQC"): "or that biota data are not available from co-located areas of high surface water contamination."
315	App F	6.1.1	66	2	The list of SW chemicals (17 of them) that screened in as iCOCs should be included in the first full paragraph on this page (i.e., the results from Table 6-1), as should a figure (similar to Figure 6-1) that shows locations exceeding the AWQC. Chemicals should not be eliminated as iCOCs just because they are present in biota as iCOCs.
316	App F	6.1.1	66	3	Remove the last paragraph on Section 6.1.1, as the screening of SW against WQC in itself provides important information as discussed above in the comments to Section 6.0.
317	App F	6.1.2	66	4	Screening of SW Data for Drinking Water – EPA Region 6 screening levels should be used for screening in the BHHRA, since Region 9 PRGs are no longer updated.
318	App F	6.2	67	4	It should be noted that EPA has not agreed to the framework shown in Figure 6-2. A revised set of flow charts based on the TZW evaluation process described in the above comment should be included in the draft HHRA.
319	App F	6.2	67	4	All unfiltered TZW data should be evaluated, including TZW data collected at depth.
320	App F	6.2	67	2	Although it is true that the TZW data used for the screening in this section were from targeted areas of contaminated GW discharge, it has not been shown that they represent "the worst case scenario for human health from exposure to TZW." The TZW studies are conservative in that they were designed to maximize the potential for detections of COIs in TZW by sampling at the time of maximum GW flux, targeting GW discharge areas, and utilizing upland GW data to identify areas where the highest COI concentrations were likely. However, the analyses were done only once per site; consequently, the data are limited both spatially and temporally and, therefore, limited for quantitative analyses of risk. Also, there are areas of the site that may have high sediment contaminant levels and that are discharge areas, but that have no TZW measurements. Therefore, data do not support the conclusion that TZW in the areas sampled by the LWG is necessarily "worst case."
321	App F	6.2.1.1	67-8	2	Screening against WQC – The list of TZW chemicals that screen in as COPCs should be included in the discussion of this screening step (i.e., the results from Table 6-1), as should a figure (similar to Figure 6-1) that shows locations exceeding the WQC. Chemicals should not be eliminated as COPCs in TZW just because they are present in biota as COCs, because the screening of TZW against WQC in itself provides important information and because biota data may not necessarily be correlated with sites where TZW data are available. While discussions like those for chrysene, manganese, and thallium are useful on a location-specific basis, they should not be used to eliminate COPCs as COCs in TZW.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
322	App F	6.2.1.2	68	2	Because VOCs and cyanide were not measured in fish tissue, these chemicals were not eliminated as iCOCs in Section 6.2.1.1. Rather, this section concludes that the AWQC for VOC are "highly uncertain." This uncertainty is stated to rise from the fact that the Veith equation used to estimate BCFs from log K_{ow} data used 7.6% lipid, since this was the lipid content of the species used in the tests. For the WQC, this lipid value was adjusted downward to 3.0 % to reflect the weighted average percent of lipid in freshwater and estuarine fish and shellfish consumed in the US. The adjustment factor from BCF values measured or predicted in the Veith et al. 1979 paper (where many of the BCFs in the human health section of older water quality criteria documents come from) is simply (measured lipid percentage / 7.6%), where 7.6% was the mean lipid content of the fish used by Veith et al. (1979) to obtain their log BCF - log Kow regression line. The BCF predictions from the log BCF - log Kow regression in Veith et al. (1979) have been compared to BCF predictions from a number of other log BCF - log Kow regressions by Devilliers et al. (1995) and found to be, on average, just as good as predictions from other regressions for the range of log Kow values between 2 and 6 (the limits of what Devilliers et al. studied). The Veith et al. 1979 regression has an advantage over some of the other published BCF - Kow regressions in that the lipid content of the fish used in the bioconcentration study is known, allowing adjustment of a measured BCF in fish with 7.6% lipid to an estimated BCF in fish with different lipid content. Not all other BCF - Kow regressions allow you to do this adjustment of measured BCFs to estimated BCFs for fish with different lipid content.
323	App F	6.2.1.2	68	3	This section evaluates the fish consumption AWQC for benzene, chlorobenzene, chloroform, cyanide, trichloroethene, and vinyl chloride, and concludes that these AWQCs are "highly uncertain." Because EPA has developed an approach that considers both tissue levels and TZW exceedance of fish consumption AWQCs in the HHRA, and because none of the criticisms described in this section were utilized, Section 6.2.1.2 should be deleted in its entirety.
324	App F	6.2.1.3	70	4	In this section, an adjustment factor of 5000 is applied to the maximum TZW concentration to "account for the differences in uptake of chemicals for TZW versus SW for shellfish." Using this adjustment factor, the list of 27 COIs that screened in (because their max values in TZW exceeded the WQC) was reduced to 2 chemicals, total DDT and total DDD. The first adjustment factor of 10 is the assumed TZW/SW ventilation ratio for shellfish. EPA does not agree with the use of this default ventilation factor, since the concentrations that biota are exposed to are dependent upon many factors (e.g., location of shellfish to and within sediment, concentration and loading of TZW). The second adjustment factor is 100 and is based on using an acceptable cancer risk level of 10^{-4} rather than 10^{-6}. This is not acceptable as ODEQ's regulations use an acceptable risk of 10^{-6} for individual chemicals and EPA's Superfund guidance uses a cancer risk of 10^{-6} as a "Point of Departure." The third factor of 5 assumes that shellfish consumption is 3.3 g/day rather than 17.5 g/day. This is not acceptable for crayfish, as the RME ingestion rate for crayfish on a composite-by-composite basis is 18 g/day. However, as discussed in a previous comment, EPA proposes using 18 g/day as the RME ingestion rate for clams, but it would be applied over a 1-mile length of the river on each side to address the resource issue. The discussion could include an evaluation of uncertainties in applying WQC from a localized TZW sample to clams. Another uncertainty for crayfish exposure that should be discussed is that loading of bioaccumulative chemicals may not be conservatively addressed by screening against WQC, as they are based upon bioconcentration, not bioaccumulation.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
325	App F	6.2.2	71	4	Region 6 screening levels should be used for screening in this section since Region 9's are no longer updated. The Region 6 screening values that are based upon non-cancer endpoints must be divided by 10. As now written, 49 chemicals (representing several different chemical classes) screened in as potential COPCs by screening the maximum concentration of each chemical detected in TZW against Region 9 tapwater PRGs and EPA MCLs. Several of these exceedances were orders of magnitude above the screening values. Surface water concentrations were modeled using loading estimates and the model presented in Appendix D. This modeling is being reviewed as a part of Appendix D. The conclusions from the use of all unfiltered TZW data with the new screening levels and any revisions to the modeling should be incorporated into Section 6.
326	App F	7.1.1	74	3	Delete the first sentence in the second paragraph: "While only the target species were included in this Round 2 HHRA, the number of species evaluated is three times more than recommend by EPA guidance (2000b)." It is not clear how the "three times " was derived, as the Tier 2 Intensive Studies discussed in this guidance recommend collection of several target species in three different size classes. Also, this guidance was developed for collecting data for use in developing fish advisories, so the DQOs are very different (e.g., source identification and development of remedial goals are not DQOs for health advisories).
327	App F	7.1.3	75	2	At the end of the first paragraph, the last three sentences starting with "Depending on the species,..." should be removed and replaced with data from the Round 3 analyses of fillet and whole body (WB) for the same fish. If the Round 1 data are to be cited in the RI HHRA, the concentrations of PCBs in fillet and WB samples of carp in each 3-mile segment should also be added to the discussion on bass and bullhead. In addition, the fact that methyl mercury preferentially accumulates in muscle tissue should be discussed
328	App F	7.1.3	75	3	Delete the last sentence in the last paragraph, starting with "Given this uncertainty...".
329	App F	7.1.4		2	This section is a bit misleading, especially for biota. For example, Table 7-2 shows only 12 analytes whose detection limits are above ACGs for biota. Because bivalves were included with the fish tissue in this analysis, it isn't clear that for PAHs in fish tissue, the detection limits were almost always above the ACGs. Text needs account for differences in the ability of fish and clams to metabolize PAHs.
330	App F	7.1.5	76	2	A table should be added showing those Round 2 clam samples (e.g., including but not limited to samples FC 9, 16, 18, 23, 26, 29, 32, and 33) that did not have all analytes and/or groups of analytes analyzed. The missing analytes should be listed as well, and the rationale provided as to why these analytes are missing (e.g. lack of sample quantity).
331	App F	7.1.6	77	2	Many of the comparisons of PBDEs between the ODHS dataset and other studies do not seem appropriate (Table 7-5). This is especially true for the salmon and lamprey in the ODHS study (anadromous species) that are compared to primarily resident fish (e.g., bass, whitefish) or fish that are essentially resident (Lake Michigan salmon). Salmon and lamprey should only be compared to other anadromous species. The PBDE levels for sturgeon in the ODHS dataset are about an order of magnitude higher than the salmon and lamprey ODHS data, and are more comparable to resident species from other studies. It also isn't clear what types of samples are being compared (e.g , whole body versus fillet versus fillet without skin). New RfDs are being developed for PBDEs. These new RfDs, which have undergone peer review and are now being reviewed by OMB, should be used in the HHRA with data from both the ODHS study and the Round 3 analyses from Region 10 EPA's lab. Further discussion is needed to decide how the results of the PBDE analyses will be presented in the HHRA.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
332	App F	7.1.6	77	4	VOCs were not analyzed in fish tissue. Based on the analysis done in Section 6.2.1.3 (5000X dilution factor for TZW to SW based upon ventilation rate, 10^{-4} rather than 10^{-6} and 3.3 g/day rather than 18 g/day), "VOCs in TZW would not result in unacceptable risk for fish or shellfish consumption." This statement is not supportable, given the lack of tissue data and the fact that 11 VOCs (max values) exceed their WQC in TZW, some by several orders of magnitude. For reasons cited above, EPA does not agree with the use of the 5000X dilution factor.
333	App F	7.1.7	77	3	EPA does not agree with the statements in this section that imply that the biota compositing scheme was overly conservative because "each species may span a home range much larger than that used for compositing." First, compositing is simply one way to obtain a data point. The use of the dataset then determines how conservative an analysis may be. For carp, a site-wide EPC was calculated from composite samples, reflecting this species' apparent large home range. If the fish collected from different parts of the river were representative of the carp population, this EPC should also be representative and no particular conservative bias is implied. Further, most of the tagging data suggest that bass stay within about a 1-mile home range or less and may cross the river infrequently - the compositing scheme in Round 1 combined fish from both sides of the river into each river mile composite. These composites appear to have taken fish from an area **larger** than their actual home range. The Round 3 data on bass may eliminate some of the uncertainty.
334	App F	7.2.2	79	3	In the first sentence on this page, the following change should be made: "...the RME scenarios represent the ~~highest~~ reasonable maximum exposures that could occur at a site under current and future conditions assuming that land and river uses do not change."
335	App F	7.2.2.1	79	2	The uncertainties due to land use changes which may make some beaches and/or in-water sediments more or less accessible and/or inviting should be discussed.
336	App F	7.2.2.3	80	3	Remove the following from the first sentence in this section: "and may not be representative of actual tissue consumption occurring within the study area."

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
337	App F	7.2.2.3	80	2	Although upper percentiles data from the fish consumption surveys cited were used for the PH HHRA, additional information should be added to this section to include the uncertainties that might under-predict fish consumption based upon these studies: (1) The Columbia Slough Study was a creel survey. As a result, it provides a very rough estimate of fish consumption rates due to many reasons, including but not limited to: • Willingness of anglers to participate (e.g., minority groups may fear talking to outsiders, particularly individuals that could be perceived as being authorities). • Communication. If a substantial number of anglers consist of 1st or 2nd generation ethnic minorities, then language may be a barrier. • Discrepancy between individuals that catch fish and prepare meals. Men generally fish but women generally prepare seafood and are much more familiar with the mass of seafood consumed. • Difficulty in translating from the items inspected in an angler's basket to portion sizes and amounts consumed, since this requires assumptions about edible portions and cleaning factors. • Lack of a random or representative sample. Interviewers get who they encounter • Timing and seasonality of interviews. • Weather conditions may bias the results of any day's interviews. (2) The CRITFC Fish Consumption Survey was done by interviewing only four of the six tribes who are party to the PH RI/FS. It is not clear how this would impact the fish consumption rate for tribal populations used in the HHRA, which was based upon the CRITFC study. Also, some published articles have suggested that the fish consumption rates in the CRITFC Study are biased low for tribal members because: • Tribal members who have a traditional lifestyle (and likely a higher consumption rate) would have been unlikely to travel to the tribal offices that were used for administering the CRTIFC fish consumption interviews. • The fish consumption rates for some tribal members that were perceived as being outliers (consumption rates were too high) were dropped from the CRITFC data before the consumption rates were calculated. • Current fish consumption rates may be suppressed and, therefore, do not reflect the potential for the higher consumption rates if fishery resources improve or if the water body becomes less contaminated. In addition, the language in the first partial paragraph on page 81 that cites tribal fishing statistics from the CRITFC study for the Willamette River should be qualified with the uncertainty that future tribal fishing habits may change after the site is remediated or due to other circumstances.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
338	App F	7.2.2.3	81	2	It should be noted that the 99th percentile rate from the nationwide study (USDA Continuing Survey of Foods by Individuals, CSFII) of 142 g/day (as calculated in *USEPA Estimated Per Capita Fish Consumption in the United States*, freshwater and estuarine fish and shellfish) was used as the high non-tribal ingestion rate in the HHRA. The 90th percentile rate from the same study (17.5 g/day) was used as the low non-tribal ingestion rate in the HHRA. Concerns have been expressed regarding the methodology used by EPA to establish these fish consumption rates, which are also recommended as default AWQC subsistence fish consumption rates in EPA's WQC Human Health Methodology guidance. Criticisms of these rates have been raised because they are based on *per capita* consumption rates from the general population – that is, "fish consumption" rates that include fish consumers and fish non-consumers alike. For example, whereas the 90% value for fish consumers is 200 g/day, the 90% value once fish non-consumers are also included is about 18 g/day; similarly, whereas the 99th percentile value for fish consumers is 506 g/day, the 99th percentile value drops to approximately 143 g/day when non-consumers are added.
339	App F	7.2.2.3	81	2	EPA disagrees that the clam consumption exposure scenario is unjustified for the following reasons: • Information from the summary of the Linnton Community Center fish consumption survey and health education (funded by OR DHS SHINE program) should be included as confirmation that shellfish from the PH site are being collected and consumed. In addition, crayfish are permitted to be collected for both recreational and commercial purpose in the WR Basin. There is no information that the PH is not being used by sports and commercial fishers to collect crayfish. The only area of the site that has warnings about harvesting is the area off of McCormick and Baxter where the Oregon Department of Human Services, Office of Public Health, maintains a health advisory for crayfish harvesting within 1,000 feet of the site. • The high and mean shellfish consumption rates that are used in the HHRA are from *USEPA Estimated Per Capita Fish Consumption in the United States*, and, like the fish consumption rates from this study used in the HHRA, are based on *per capita* consumption rates from the general population – that is, consumption rates that include shellfish consumers and non-consumers alike. Consumer-only rates were not calculated in the EPA document for shellfish alone, but it is likely that they are higher for consumers only compared to the rate based on both consumer and non-consumers. • Also, it is stated in the Round 2 HHRA, in the EPA document, "shrimp, which is not found within the Study Area, accounted for more than 80 percent of the shellfish consumed. Crayfish accounted for less than 1 percent of the shellfish consumed, and freshwater clams were not even included in the nationwide survey." This does not consider that if certain types of fish or shellfish are not available in a water body, fishers (including transients) are likely to substitute alternative local types of shellfish.
340	App F	7.2.2.3	81	3	In the last paragraph of this section, change "are likely to result in overestimating the risks" to "provide a health protective estimate of the risks."
341	App F	7.2.3.1	82	2	The statement is made that, "However, in cases where the DLs were above ACGs and the chemical was detected infrequently, use of one-half the DL could impact the risk results. In these cases, additional evaluation of the method used to estimate non-detect results may be warranted." It is not clear what method would be used or for which cases. See general comment above regarding Pro UCL and how to evaluate non-detected results.
342	App F	7.2.3.1	82	2	There is no discussion on the uncertainty in using only 5-10 samples to calculate the 95% UCL on the mean. See general comment above regarding estimating a 95% UCL on the mean.
343	App F	7.2.3.3	83	2	In EPA's Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories (EPA 2000), while most of the studies showed that there were percent reductions in PCBs due to cooking; one study actually showed a net gain. In addition, the impact of cooking on mercury should be summarized here.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
344	App F	7.2.3.4	83	2	Remove the clause: "so use of 10% for inorganic arsenic is likely overestimates the EPC for inorganic arsenic." We have no data from this site on the actual inorganic arsenic levels in fish. In addition, the Duwamish data for inorganic arsenic in bivalves should be summarized here, and the uncertainty previously provided to EPA by Laura Kennedy should be included.
345	App F	7.3	84	3	In the first sentence, delete the words "which are established by state and federal policy, are deliberate overestimates of the potential dose-response." EPA's toxicity factors are based upon science, although policy issues do play a role in their development. Also, EPA's toxicity factors are not meant to be deliberate overestimates. Toxicity factors are developed using conservative assumptions to ensure protection of public health. Later in the same paragraph, the following modification should also be made: "actual risks at this site ~~are likely to~~ could be lower than the potential estimates calculated in this HHRA."
346	App F	7.3.1	84	4	Rather than discuss the uncertainty in using the 1997 WHO TEFs, the 2005 TEFs should be used for the RI HHRA.
347	App F	7.3.2	85	2	We did not include a scenario for child consumption of shellfish, which could be an issue for clams as PAH levels are highest in clams, especially at and downstream of GASCO. There doesn't appear to be a shellfish consumption estimate for ages less than 18 in *USEPA Estimated Per Capita Fish Consumption in the United States*; however, a childhood rate could be developed using the same assumptions that were used for the fish consumption rates.
348	App F	7.3.5	86	2	It should be noted that the Arkema site has a chromium VI plume in groundwater that is discharging to surface water.
349	App F	7.4.2	87	2	It should be noted in the uncertainty section that cumulative risks of uplands and river exposures would likely lead to a much higher estimation of overall risk.
350	App F	7.4.3	87-88	2	Following changes should be made to text in section 7.4.3: Arsenic and mercury were found to result in risks greater than 10^{-6} or an HQ of 1 for at least one of the exposure scenarios evaluated in this HHRA. Metals are naturally occurring chemicals and may be present in tissue, water or sediment due to background concentrations. ~~For example, the concentrations of arsenic and mercury in fish tissue samples collected within the Study Area were compared with concentrations in fish tissue samples collected at upstream locations and found to be similar~~. For beach sediment, the exposure point concentrations ranged from 0.7 to 9.9 mg/kg and are generally consistent with the default background soil concentration for arsenic of 7 mg/kg used by DEQ (WDOE 1994). In addition to naturally occurring metals, anthropogenic background may contribute to the overall risks. ~~Attachment F1 presents the evaluation of risks from consumption of upstream fish tissue. These risks were calculated using the same exposure assumptions as were used for calculating risks from consumption of fish tissue collected within the Study Area. The evaluation of risks from upstream tissue demonstrates that upstream contributions result in cumulative cancer risks that exceed the target risk of 10-4 and noncancer hazards that exceed the target HI of 1.~~ While risks were presented in this Round 2 HHRA without accounting for contributions from background, it is important to recognize that background concentrations may result in unacceptable risks based on the exposure assumptions used in this Round 2 HHRA. ~~The contribution from background is also important to consider in establishing remedial goals, as it may not be possible to achieve EPA's target risk levels.~~
351	App F	7.5	88	1	Please note the recommended changes presented in EPA comments on Table 7-6 below.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
352	App F	Tables	N/A	2	For all EPC tables showing dioxin-like PCB TEQ and dioxin/furan TEQ, an additional line should be added that shows the sum of these. This was done in the Round 1 EPC Tech Memo at EPA's request, and it should be done in these tables as well. In addition, for the Risk Characterization tables, total risk from carcinogenic PAHs and from all TEQ (dioxin-like PCBs and dioxins/furans) should be included in the tables. Several tables appear to have missing information in the "Non-Detects" and "Total Samples" columns.
353	App F	Tables 2-3 and 2-5	N/A	2	The SW and TZW data used for both the Round 2 HHRA and the screening in Section 6 should be included in these tables, and it should be clear which datasets used for each.
354	App F	Table 2-5	N/A	2	For the TZW in Table 2-5, it is not clear here or in the text how the TZW data used for screening were selected. For example, was the max value from any of the TZW datasets (filtered or unfiltered) used?
355	App F	Table 2-6	N/A	4	The 2005 WHO TEFs should be substituted here.
356	App F	Table 2-8	N/A	2	"Residential Use Beaches" should be changed to Beaches Used for Recreation, by Transient, and/or by Fishers.
357	App F	Table 2-9	N/A	2	Some of the maximum values in this table do not match those in Table 6.1-1 in the main body of the Round 2 Report (lower by 2x or so). This may be because different datasets were used (e.g., QA1 versus QA2). This should be explained in footnotes here and in Table 2-2 (and throughout the Round 2 Report), so it's clear why data tables may differ. The Round 2 Report should include a discussion or justification showing that use of ODEQ's RBC for transformer mineral oil for evaluating heavier oils is appropriate and protective.
358	App F	Tables 2-1 and 6-1	N/A	2	These tables include the surface water data used for the Round 2 HHRA (Table 2-10) versus that used for the screening of surface water in Section 6 (Table 6-1). Also, only PCB congener data were used. A short discussion should be included to show what the difference would be if the Aroclor SW data were also used in addition to total congeners.
359	App F	Table 3-1	N/A	2	The LWG would need to add use of surface water as a drinking water source (i.e., residential and/or industrial/commercial) if these are added to the BHHRA. However, only arsenic and possibly lead would be included as COPCs in the HHRA in these pathways.
360	App F	Table 3-1	N/A	2	The footnote to Non-tribal Fisher is "non-tribal fishers include three different fish ingestion rates and 2 different fishing frequencies." Make sure this is clear in the text.
361	App F	Table 7-6	N/A	2	Table 7-6 – Qualitative tables of uncertainties: As now written, a ranking of "low" under Level of Protection/Conservatism may imply that the assumption is health-protective to a small degree. In fact, some of the assumptions are not health-protective, and may underestimate risk. For example, if we did not analyze for certain chemicals or if the ones that were detected do not have toxicity values, we are not quantifying the potential additional risks. One possible revision is to separate the evaluation of Level of Protection/Conservatism into two columns: Likelihood That Risks are 1) Underestimated, or 2) Overestimated. The low/medium/high designations can be added to either column. The "overestimated" likelihoods are reflected in the current table. A few of the assumptions should switch to "underestimated."

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
362	App F	Figure 3-1	N/A	4	EPA's December 2, 2005, Identification of Round 3 Data Gaps Memorandum included a Conceptual Site Model (CSM). This CSM should be used as the basis for the HHRA. Specific comments on Figure 3-1 are provided below: Release Side: Figure 3-1 represents a simplified version of the release model focused on loading terms. However, certain key processes are not presented, such as sediment resuspension, desorption and scouring. EPA recommends retaining the detail in the release model but making it consistent with the loading terms being considered in the Portland Harbor RI/FS. In addition, groundwater transport (dissolved/NAPL) should be changed so that particulate and colloidal contaminants are included. Exposure Side: The following changes should be made reconcile differences between the EPA-developed CSM and Figure 3-1 1. Under Exposure Media, TZW should be included as a source to SW. 2. The ingestion of SW as drinking water by on-site worker and residents should be added back into the CSM. 3. Dock-workers and in-water workers do not include exposure to SW as a "potentially complete but evaluated under a different receptor category." 4. Recreational fishers and Non-tribal fishers have been combined into Non-tribal fishers, and the footnote explains that non-tribal fishers include 3 different fish ingestion rates and 2 different fishing frequencies. Name changes may need to be made to eliminate confusion among these different receptors. 5. Please explain why the footnotes in EPA's CSM were removed. In addition further discussion is required to explain why certain exposure pathways are evaluated and others are not. The rationale for evaluation/non-evaluation should be included. Pathways not evaluated should be addressed in the uncertainty section.
363	App F	Figure 5-1	N/A	2	Beach Sediment, Direct Contact for all Receptors, Exposure Areas of Cumulative Risk >10^{-6} or HI>1. The beach sample numbers from Figure 2-1 should be added to this figure so it is easy to correlate the discussion in the text with the figure. Also, it would be useful to use some additional colors, as it is difficult to distinguish between the three shades of green and the orange/red.
364	App F	Figure 5-1	N/A	2	Include separate figures showing (1) risks greater than 10^{-5} and HI>1 , and (2) risks greater than 10^{-6} and HI>1 after subtracting risks from background arsenic (assuming a value of 7 for background from ODEQ bioaccumulative sediment guidance or a different value developed as a part of the RI).
365	App F	Figures 5-2 and 5-3	N/A	2	In Water Sediment, Direct Contact for all Receptors - It would be useful to have a figure showing the In-Water Sediment Exposure Areas that are greater than a cumulative risk level of 10^{-5} and HI>1 for the RME exposure scenarios.
366	App F	Figures 5-4 and 5-5	N/A	2	Additional figures should be included. At a minimum, it would be useful to have a figure showing the shellfish collection areas that are greater than a cumulative risk level of 10^{-5} and HI>1 for the RME exposure scenarios.
367	App F	Figures - General	N/A	2	There are no figures which show the Risk Characterization results for fish. These will need to be added to the RI HHRA (see comments in Generic Issues).

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
368	App G	General Comment	N/A	5	EPA will be submitting a screening-level risk assessment (SLERA) and problem formulation for the baseline ecological risk assessment (BERA). The SLERA should be used to identify chemicals to be carried forward into the BERA. A refined screen may be performed to take into account Round 3 data, but EPA expects that the EPA SLERA will serve as the primary screening step for the BERA. The BERA problem formulation will serve as the basis for a final problem formulation to be developed by LWG and a mechanism for reaching agreement how to perform the BERA.
369	App G – Main Text	2.2	8	2	The Report states that after the identification of a "Round 2 COPC" the next step in the evaluation, regardless of the receptor of concern, is to "develop exposure concentration (UCLs, location-specific) and compare to criteria." COPCs not exceeding the UCLs are not retained as iCOCs. The text should instead say "compare to appropriate exposure point concentration for the receptor of interest." A table listing all of the exposure point concentrations and how they should be calculated should be developed based on the attached analysis plan and presented in the baseline ecological risk assessment (BERA). For example, it is not appropriate to use a site-wide UCL to evaluate the risk to sessile clams across the ISA. In some cases a point-by-point estimate is still the appropriate exposure point concentration.
370	App G – Main Text	2.1.1	6	4	Surface-weighted average concentrations should not be used to calculate exposure point concentrations for any measurement endpoint in the BERA. Exposure point concentrations should be on a location-specific basis or estimated based on the 95% UCL of the mean.
371	App G – Main Text	2.2	8	4	In addition to the floating percentile method (FPM), the logistic regression model should be used as a screening criteria for the identification if iCOCs consistent with the EPA-developed problem formulation and weight of evidence evaluation.
372	App G – Main Text	2.2.1	9	4	Crustal elements, including aluminum, beryllium, cobalt, iron, magnesium, manganese and potassium, were eliminated from the screening evaluation. These chemicals should be screened like any other COI, since they can be elevated and toxic as a result of industrial activity. This is of particular concern for manganese, since it is elevated within the Portland Harbor site (see Figure 2.7).
373	App G – Main Text	3.1.3 Figures	17 Figure 3-1	4	The EPA has developed a CSM based on the CSM presented in our December 2, 2005, Identification of Round 3 Data Gaps Memorandum. This CSM will be EPA's problem formulation for the baseline ecological risk assessment. Figure 3-1 should be modified to reflect the benthic community portion of the EPA-developed CSM. EPA also recommends including a comprehensive CSM for all receptor groups and environmental media.
374	App G – Main Text	3.1.4	18	4	All lines of evidence should be used in determining areas of potential concern, not just the results of the toxicity test and the toxicity testing predictive model.
375	App G – Main Text	3.1.5	19	4	For the predictive tissue evaluation, COIs were identified as COPCs if the predicted 95th percentile tissue concentration exceeded the TRV. Individual tissue concentrations predicted based on application of BSAFs to sediment concentrations should be generated. Points exceeding the TRV should be indicated just like field-collected samples that exceed the TRV. See also Section 3.3, Page 26 and Section 3.3.1.6, Page 29.
376	App G – Main Text	3.1.5	19	4	The assessment of risk to invertebrates should be based on a location specific basis.
377	App G – Main Text	3.3	25	4	The Round 2 mussel tissue data should be included in the tissue residue assessment, for risks to mussels themselves as well as a dietary component of fish and wildlife risk evaluations. Compare mussel concentrations to acceptable tissue concentrations in prey for protection of fish and wildlife.
378	App G – Main Text	3.3.1.1	26-7	4	The field-collected clam tissue should be used to determine iAOPCs – not the site-wide UCL screening. Areas that present risk to the benthic community on a location-specific basis should be identified.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
379	App G – Main Text	3.3.1.6	29	2	The sediment data used here are not shown. The complete analysis of predictive tissue data should be available for review. LWG should develop predictive tissue concentrations based on BSAF relationships and using individual sediment points. Develop relationships for PCBs, DDTs, and dioxin and furans, and compare these to the food web model results. Calculate BSAFs on a PCB, DDTs, dioxin and furan congener-specific basis where data are available to do so, then back-calculate dioxin TEQs from the predicted individual congener tissue concentrations. For PCB samples without congener data, calculate BSAFs using total PCB and Aroclor data.
380	App G – Main Text	3.4	35	4	The screening for invertebrates should include all surface water sampling locations, not just the near bottom samples. This will ensure that the screening step addresses benthic, epibenthic and water column invertebrates.
381	App G – Main Text	3.4.1	37	4	Surface water EPCs should not be represented by the UCL of the mean concentration for near-bottom SW samples collected from within the Study Area, because the Study Area is not representative of the spatial exposure scale of benthic invertebrates. Surface water risks should be estimated on a sample--by-sample basis for each available water sample.
382	App G – Main Text	3.5	38	4	EPA has developed a process for evaluating TZW in the BERA. All TZW should be screened against AWQC and other applicable screening level values (SLVs) and evaluated as a line of evidence in the BERA. The screening evaluation should consider the following elements: • The screen should include total metals for all metals. • The contaminant should not be screened out if a groundwater source has not been identified. The screening should be presented along with the uncertainties. It may be that a source has not been identified yet, or it could be that the contaminant is becoming more bioavailable as groundwater passes through sediment. • Upstream chemistry data for metals should not be used at this stage of the evaluation. • The sampling locations that screen in should be clearly presented. • TZW results that screen in should be evaluated as a line of evidence in the BERA consistent with the problem formulation. • Factors such as the size of the discharge area, spatial trends, pore water ventilation, and dilution, should be presented in the uncertainty section. • The screen of TZW should include the deeper probe samples in addition to the screen of the shallower probe samples.
383	App G – Main Text	3.5.1.1.1	39	2	In general, chemicals without SLVs should be carried forward in the risk assessment process. Realistically, chemicals without SLVs or other benchmarks cannot have risks quantified in the BERA. However, such chemicals should be identified as chemicals of potential ecological concern in the BERA problem formulation and risk characterization, and presented and discussed in the uncertainty section. For example, although it is possible to screen 2,3,7,8-TCDD concentrations through comparison to a 2,3,7,8-TCDD water SLV, other detected dioxins and furans should also be carried forward. Specifically, dioxins and furans without individual congener SLVs should be converted to TEQs, and the total dioxin/furan TEQ compared to risk levels.
384	App G – Main Text	3.5.1.1.1	39	2	The hardness reported for filtered samples seems high, and should be reviewed for accuracy. The average, median and maximum hardness concentrations are 478 mg/L, 238 mg/L and 3,357 mg/L CaCO3 respectively. Further clarification and discussion of these results is required in the draft RI and risk assessment reports. EPA guidance does not recommend using hardness adjustments for waters greater than 400 mg/L as $CaCO_3$ hardness. Any corrections should be clearly shown in a table for each sample and applied on a sample-by-sample hardness adjustment or area-by-area basis, as appropriate – not as an average over the entire site.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
385	App G – Main Text	3.5.1.1.3	40	5	A comparison to upstream metal concentrations is part of the refined screen, as described in the BERA analysis plan. Agreement on the background dataset to be used for site-to-background comparisons will be required prior to performing this portion of the refined screen.
386	App G – Main Text	3.5.1.1.4	40	2	The additional evaluations presented in this section should be presented in the risk characterization or the uncertainty section of the BERA, as appropriate.
387	App G – Main Text	3.5.1.2.1	41	2	The elimination of chloroethane based on an incomplete groundwater pathway should be further justified. If chloroethane is present in TZW above screening criteria, it should be retained and evaluated in the BERA as a line of evidence.
388	App G – Main Text	3.5.1.2.3	41	2	Site-wide trends in TZW and exceedances of Eco SLs across the study area should not be used to further eliminate COPCs from further analysis. TZW COPCs are likely to be very localized to an area of concern. They should be retained even if exceedances are limited in extent (e.g., in one area of concern). For example, cadmium, copper, lead and nickel should be retained and evaluated as a line of evidence in the BERA. Areas of exceedances should be depicted on maps. This also applies to the herbicides, VOCs and SVOCs that were eliminated.
389	App G – Main Text	3.5.4	47	2	The purpose of the equilibrium partitioning assessment and the selection of the chemicals to be included in the equilibrium partitioning assessment are not clear. Mechanistic-based sediment quality values derived from equilibrium partitioning were identified as a line of evidence for the BERA in Table 3-2. However, not enough information is presented to evaluate the analysis presented in this section. Further direction on the use of mechanistic-based sediment quality values will be provided in EPA's problem formulation for the BERA.
390	App G – Main Text	3.6.1.1	50	2	The floating percentile model for predicting benthic risk (FPM) did not evaluate 39 sediment samples because these were analyzed primarily for PAHs. The draft BRA Report should provide justification for this step. Samples not evaluated should be clearly listed in a separate table.
391	App G – Main Text	3.6.1.2	51	5	EPA has developed a problem formulation for the BERA that describes the approach for estimating exposure point concentrations for the tissue residue assessment. This approach should be used in the BERA. As stated in previous comments, exposure point concentrations for clam, Lumbriculus, and crayfish tissue should not be done as a site-wide UCL on a mean value.
392	App G – Main Text	3.6.1.2	51	4	One of the objectives of this assessment is to evaluate local populations of clam, crayfish and Lumbriculus invertebrates. Therefore, invertebrate tissue data should be presented on a composite-by-composite basis. In the evaluation presented here to determine iCOCs, an HQ could have exceeded 1 at a given area, but if the site-wide UCL did not exceed a HQ of 1, it was not carried forward as a "Round 2 iCOC." Any individual sample or sample composite HQs that exceed 1 will be carried through in the BERA.
393	App G – Main Text	3.6.1.2.1	52	4,5	Concentrations of total PAHs in field-collected clams exceeded the aquatic TRV (risk to clams themselves) of 1,000 ug/kg ww at four locations: downstream of ARCO (BT012), US Moorings (embayment (BT014), adjacent to GASCO (BT015), and downstream of Arkema (BT017). For PCBs and total DDTs, the concentrations measured in field-collected clams exceeded the respective TRVs at Willamette Cove and downstream of Arkema, respectively. As stated above, field-collected clams should be evaluated on a composite-by-composite basis. Other lines of evidence for evaluating the benthic community should also be assessed consistent with EPA's WOE approach presented in the attached problem formulation.
394	App G – Main Text	3.6.1.2.2	53	4	The following Round 2 iCOCs for laboratory-exposed clams dropped out when the site-wide UCL was calculated (see also Table 3-38). Total PAHs: Downstream of ARCO (BT012). As stated above, laboratory-exposed clams should be evaluated on a composite-by-composite basis as an LOE in the BERA, with chemical concentrations in any individual samples exceeding a HQ of 1 retained as iCOCs.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
395	App G – Main Text	3.6.12 2.2	53	4	The following Round 2 iCOCs for laboratory-exposed worms dropped out when the site-wide UCL was calculated (See Figure 3-12 and Table 3-39). Locations are included for clarity: • Arsenic: International Slip (BT005), Terminal 4 Slip 1 (BT008), Linton Plywood (BT011), GASCO (BT015), Ridell Cove (BT019), McCall upstream of Willbridge docks (BT021), and Goldendale Aluminum (BT033). • Zinc: OSM (BT001 and BT002), Terminal 4, Slip 1 (BT007), McCall upstream of Willbridge docks (BT021), Front Avenue LP (BT024), Swan Island (BT023) and (BT026), Terminal 2 (BT032). • Benzo(a)anthracene: ARCO (BT012), and US Moorings (BT014). • Benzo(a)pyrene: US Moorings • Benzo(b)fluoranthene: ARCO (BT012). • Benzo(k)fluoranthene: US Moorings (BT014). • Dibutyl phthalate: Willbridge (mouth of Saltzman Creek) (BT020) As stated above, laboratory-exposed worms should be evaluated on a composite-by-composite basis as an LOE in the BERA, with chemical concentrations in any individual samples exceeding a HQ of 1 retained as iCOCs.
396	App G – Main Text	3.6.1.2.4	59	4	Site-specific BSAFs should be used to predict tissue concentrations at chemistry locations on a sample-by-sample basis. This information should not be used to develop a site-wide UCL concentration. Location-specific predicted tissue concentrations should then be compared to TRVs to estimate risks. Table 3-40 should present the range of HQ values based on sample-by-sample analysis. EPA is in the process of preparing detailed comments on the BSAF development process presented in Appendix E.
397	App G – Main Text	3.6.1.3	62	4	The evaluation of surface water should be performed on a point-by-point basis. While near bottom samples may be used to evaluate risks to benthic invertebrates, other surface water samples should be used to evaluate risks to water column zooplankton and epibenthic invertebrates. For example, Willamette Cove does not show up screening in here (see Figure 3-13), although it is a relevant sample for the evaluation.
398	App G – Main Text	3.6.1.4	63	2	Exceedances should be plotted by site with other lines of evidence. Table 4-4 in Attachment G2 shows the COPC screen for TZW. All COIs without SLVs should be carried forward as Round 2 COPCs. Most importantly, this would screen in TPH (diesel range hydrocarbons, gasoline range hydrocarbons, residual range hydrocarbons, and total petroleum hydrocarbons). If there are no SLVs, risks can be identified with further bioassay testing
399	App G – Main Text	3.6.2.2	67	2	During the clam bioaccumulation testing, growth and mortality data were collected. This data should be presented in the BERA as it provides growth the mortality toxicity data for another benthic species important in the lower Willamette River – clams. Based on the description presented in the Round 2 Report, this data shows that clams exposed to sediment samples collected at nine locations had less growth than in the control (60 to 79% of the initial estimated loading biomass or the final control biomass). These locations included downstream and upstream of Oregon Steel Mills, Terminal 4 upstream of Slip 3, US Moorings, GASCO, Willamette Cove, Ridell Cove, Portland Shipyard and Goldendale. The mortality data was not described, other than to say that survival rates ranged from 97 to 100% for the test organisms and the controls.
400	App G – Main Text	3.7.2	73	2	Following EPA and Oregon DEQ Risk Assessment Guidance, COIs without TRVs need to be carried through as COPCs. Such COPCs should be identified in the BERA problem formulation and risk characterization as chemicals where risks cannot be quantified. The lack of TRVs for chemicals such as 2-methylnapthalene and benzyl alcohol should be addressed in the uncertainty section.
401	App G – Main Text	3.8	76-9	2	Round 2 COPCs were further refined in this section to exclude Round 2 COPCs that exceeded TRVs based on single outlier data points, NJ-qualified data, or non-detects causing the UCL HQ exceedance. These chemicals should only be eliminated consistent with procedures identified in the refined screening process described in EPA's BERA problem formulation and discussed in the uncertainty section of the BERA.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
402	App G – Main Text	3.8	79	4	Risks to the benthic community should be evaluated using all benthic lines of evidence, not just the toxicity testing results and FPM predicted toxicity results. The weight of evidence approach outlined in EPA's BERA problem formulation should be applied to assess risks to the benthic community.
403	App G – Main Text	Tables	3-4	5	While there may not have been enough samples to included in a sediment predictive model, the detection of these contaminants in sediment should screened against other sediment SQGs as part of the SLERA and evaluated as a line of evidence in the BERA.
404	App G – Main Text	Tables	3-26	2	The dataset used for the analysis of background metal concentrations should be presented.
405	App G – Main Text	Tables	3-34	2	A total of 167 samples are in the "indeterminate" category based on conflicting predictions from the FPM and logistic regression models. However, the final risk classification for individual samples will be based on FPM and LR model predictions used in conjunction with other lines of evidence. In addition, the list of iCOCs identified based on the FPM is limited. Additional comments on the FPM itself will be sent in a separate group of comments. As a result, the evaluation of additional lines of evidence should be presented here, including national SQGs and tissue residue lines of evidence, consistent with procedures in the BERA analysis plan, to determine potential risks at any given sampling location.
406	App G – Main Text	Tables	3-11	2	It is unclear why all the samples with HQs≥1 are not shown on the map. For example, there are several stations where the total PCBs values exceed an HQ of 1 (e.g., Willamette Cove, with a value of 2,660 ug/kg). These should be presented in the draft RI and risk assessment reports.
407	App G – Main Text	4.1.2.1	81	2	Risk estimates (for all contaminants) for all fish species where whole body tissue data are available should be presented in the risk characterization section of the BERA.
408	App G – Main Text	4.1.2.3	84	2	White and black crappie should be classified as invertivores feeding on water column prey items.
409	App G – Main Text	4.1.3	84	4,5	The EPA has developed a CSM based on the CSM presented in our December 2, 2005, Identification of Round 3 Data Gaps Memorandum. This CSM is presented in EPA's problem formulation for the ecological risk assessment. Figure 4-1 should be modified to reflect the fish portion of the EPA-developed CSM. EPA also recommends including a comprehensive CSM for all receptor groups and environmental media.
410	App G – Main Text	4.1.4	85	4,5	The salmonid olfactory and lesion occurrence in benthic fish were given a weight of zero based on the SLERA results. These two lines of evidence should be weighted according to the weight of evidence formula presented in EPA's problem formulation for the BERA. Surface water data should be compared to water concentrations known to result in olfactory impairment for salmonids. In addition, the health assessment information collected during the Round 3 biota tissue sampling effort should be assessed to determine the incidence of lesions in benthic fish collected from the Portland Harbor site.
411	App G – Main Text		86	4	Sculpin-specific BSAFs should be used to estimate tissue residues in sculpin from locations where empirical sculpin data are unavailable; then the predicted residues should be compared to the applicable tissue residue benchmark. This should be done for all site data, not just to the 95th percentile of site-wide sediment data.
412	App G – Main Text		88	4	An average lipid value should not be used in developing BSAF and other relationships. Rather, each sample should be lipid-normalized by the sample-specific lipid value and these lipid-normalized values used with sample-specific, TOC-normalized sediment contaminant concentrations in any subsequent analysis.
413	App G – Main Text		89	5	The Round 2 COPC risk analysis for tissue residue was based on the LWG-recommended NOAEL and LOAEL TRVs (presented in the PRE) because "the use of SL TRVs is uncertain for evaluating risks to fish." EPA will provide direction on TRVs for use in the refined screen and subsequent portions of the BERA at a later date.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
414	App G – Main Text	4.2.2.9	93	2	If a total DDT number is selected, each isomer should also meet that value.
415	App G – Main Text	4.3.1	94	4,5	For the dietary exposure assessment, LWG assumed that all fish receptors in the dietary dose LOE forage throughout the study area (e.g., a site-wide use factor of 1 in equation 4-1). However, this assumption is not correct for some species such as sculpin and smallmouth bass. EPA will provide an exposure factor table for the various target ecological receptors for use in the BERA.
416	App G – Main Text	4.3.1.1	95	4,5	Regarding equation 4-3, body weights for the dietary assessment should not be based on average body weights – the range of body weights should be represented in these equations as measured in the tissue sampling efforts. The big parameters that will influence these equations are body weight and temperature (influences feeding rate), and the range of both should be presented in this analysis. A range of body weights and temperatures relevant to site conditions should be evaluated. An exposure factor table for the various target ecological receptors will be presented in EPA's BERA problem formulation.
417	App G – Main Text	4.3.1.1	96	4, 5	The chemical concentration in sediment should not be calculated as the UCL over the sediment exposure area for all receptors. Using only site-wide assumptions for all receptors is not conservative for some species (an SUF of 1 equals the entire site). UCLs should be calculated based on the home range of the species of interest. Direction on exposure scale will be provided in our problem formulation for the BERA.
418	App G – Main Text	4.3.1.1	96	5	Laboratory bioaccumulation clams were not used in the dietary prey scenarios. Both laboratory and field-collected clams should be used in the dietary prey scenarios. Additional information on how clam tissue should be used in the various dietary prey scenarios will be presented in EPA's BERA problem formulation.
419	App G – Main Text	4.3.2	105	5	EPA will provide direction on TRVs for use in the BERA at a later time. Dietary dose TRVs can be estimated from either the concentration in food (mg/kg) or ingested dose (mg/kg/day) literature, assuming individual literature citations present the necessary information to convert the units. When two types of TRV sources (concentration and dietary) are utilized, a larger available dataset will result, from which a TRV could be derived. As a result, concentration-based TRVs should be included. This will increase the number of TRVs that can be used in the BERA. For example, only four PAH studies were evaluated, whereas the Corps used 15 studies to develop their fish dietary TRV.
420	App G – Main Text	4.4.1	110	4	Surface water EPCs should not be estimated from the average of samples collected using both the peristaltic pump and the XAD system. Instead, surface water samples should be evaluated on a sample-by-sample basis.
421	App G – Main Text	4.4.2	111	2	The total PCB Eco SL for surface water in Table 4-35 is based on the EPA 2006 CCC (chronic) AWQC of 0.014 µg/L. The acute value of 2 µg/L is based on ODEQ.
422	App G – Main Text	4.5.1	112	4,5	Exposure to TZW should be complete for appropriate fish receptors. A revised CSM will be presented in EPA's BERA problem formulation. A limited pore water ventilation rate for sculpin and lamprey (0 to 10%) should not be used for the evaluation of direct toxicity, as it is inconsistent with the measurement endpoint of comparison of TZW concentrations to AWQC. In addition, the text and tables are not clear about what specific pore water ventilation rate was used in this assessment.
423	App G – Main Text	4.6.2	114	5	The range of potential dietary doses should be presented, as well as implications for varying body size and temperature. The dietary approach will be presented in EPA's BERA problem formulation.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
424	App G – Main Text	4.6.3	115	4	Screening should be presented in the SLERA on a sample-by-sample basis. For BERA, exposure point concentrations should be developed on a receptor-by-receptor basis that considers home range and location in the water column. For example, Table 4-52 on Page 351 shows the 95% UCL of the mean EPCs used in this equation to evaluate risk. The total PCB EPC was 0.0051 ug/L for peristaltic pump and 0.00325 ug/L for XAD, even though the maximum concentrations were 0.018 ug/L and 0.012 ug/L, respectively, for each method listed in the ERA dataset (see Table 6-5 in Attachment G1, EPCs in Surface Water).
425	App G – Main Text	4.6.3	115	2	The discussion in this section regarding TZW exceedances is presented for only a subset of TZW chemicals that screen in (PAHs, DDTs, cyanide and perchlorate). According to Section 3.5 (TZ Water Assessment for Invertebrates), there were 53 Round 2 COPCs identified after comparison to water Eco SLVs, including 8 metals, 2 herbicides, 16 PAHs, 6 pesticides, 3 SVOCs, and 16 VOCs. All COPCs identified in the screen should be carried through to the BERA. See also attachment G2.
426	App G – Main Text	4.7.1.1	116	2	Uncertainties associated with the composite fish samples relative to the range of exposure that may actually exist at the site should be discussed in the uncertainty analysis. This is especially important for fish that were likely composited over an area larger than their home range, such as bass collected during Round 1.
427	App G – Main Text	4.7.1.1.3	117	2	Composites for which the reporting limit exceeded the SL TRVs should be documented and addressed in the uncertainty analysis. In this Report, these instances were not carried forward (e.g. COIs were not retained as Round 2 COPCs). Table 4-53 shows the contaminants for which this occurred, which were mostly hexachlorocyclohexane (beta and delta), bis (2-ethylhexyl) phthalate, and dibutyl phthalate. This occurred in largescale sucker, sculpin, juvenile Chinook, smallmouth bass and northern pikeminnow tissue. In some cases the reporting limit exceeded the TRV by several orders of magnitude.
428	App G – Main Text	4.7.1.1.5	118	2	This section should be revised to include dioxin TEQ numbers calculated using a fish TEF. A dioxin TEF for all dioxins and furans and dioxin-like PCBs should be used for comparison to a dioxin TRV.
429	App G – Main Text	4.7.1.1.7	119-120	5	The use of either a UCL or the 80th percentiles are mentioned here as appropriate exposure point concentrations for fish. Fish composites for evaluation of fish health should be evaluated on a composite-by-composite basis in the SLERA and BERA. It is not appropriate to utilize the 80th percentile as an EPC for a population-level evaluation. Risks should be estimated on two exposure point concentrations: a central tendency value (e.g., mean or median) and the 95% UCL of the central tendency summary statistic.
430	App G – Main Text		121-122	2	An uncertainty analysis was presented in this section to determine if the use of a site-wide exposure scale for all fish species is not conservative for species that range over smaller areas. However, sediment ingestion and prey items were varied individually (not together and co-located) to evaluate any potential changes in the HQs. This analysis should be re-run in the BERA to evaluate more localized areas using sediment and prey (e.g., clam and worm tissue) that vary throughout the receptor-specific exposure area, not just the entire Portland Harbor study area.
431	App G – Main Text	4.7.2.1.6	125	2	The uncertainty analysis should be performed with the range of prey tissue concentrations, not just an EPC based on a UCL value. In addition, the Report states that the uncertainty analysis was conducted only on those contaminants identified as Round 2 COPCs using a fixed prey composition (with no uncertainty analysis). Therefore, this analysis was done only on a limited list of chemical receptor pairs (those shown in Table 4-55) – e.g., only copper, mercury, total PCBs and Total DDTs . It will be important to go back and complete the uncertainty analysis for dietary items for all dietary COIs using appropriate dietary TRVs. This will be an important analysis for PAHs, which seem to drop out of this uncertainty analysis.
432	App G – Main Text	4.7.3.1.1	129	4	The 80th percentile of the data is identified again in this section as the appropriate population level endpoint. EPA does not accept the use of the 80th percentile of the data as an appropriate exposure point concentration for risk characterization.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
433	App G – Main Text	4.8	131	5	A discussion of the identification of Round 2 COPCs must be based on the refined screen to be presented in EPA's BERA problem formulation. The results of the BERA should include a spatial analysis of the results (e.g., how many composites of each species screen in and where they are located).
434	App G – Main Text	4.8	133	4	All chemicals with HQs greater than or equal to 1 should be identified and retained as rCOCs. Dropping metal COPCs such as cadmium and copper because they were not identified by other fish LOE is inappropriate in the SLERA. Toxicity from metals can occur to fish gills, a pathway which is not "covered" by other lines of evidence such as tissue residue or the dietary pathway.
435	App G – Main Text	Tables	348-350	2	PAH HQs should be presented in Tables 4-47 through 4-51 for the evaluation of risk to sculpin, peamouth, juvenile Chinook, smallmouth bass, and northern pikeminnow.
436	App G – Main Text	5.1.2	137	2	The kingfisher should be included in the uncertainty section as previously requested in EPA comments. This bird ingests a lot of fish and is present year-round. The purpose of the evaluation is to confirm that the evaluations performed on bald eagle, osprey and merganser are protective of the kingfisher.
437	App G – Main Text	5.1.3	138	5	The EPA has developed a CSM based on the CSM presented in our December 2, 2005, Identification of Round 3 Data Gaps Memorandum. This CSM will be presented in EPA's BERA problem formulation. Figure 5-1 should be modified to reflect the wildlife portion of the EPA-developed CSM. EPA also recommends including a comprehensive CSM for all receptor groups and environmental media.
438	App G – Main Text	5.1.4	140	2	The text states "The Round 2 COPC lists were integrated across LOEs to derive the overall list of Round 2 COPCs for fish." The text here should state wildlife.
439	App G – Main Text	5.1.5.1	141	5	The results of the identification of Round 2 COPCs will change with the use of EPA-recommended TRVs. EPA will be providing TRVs for use in the BERA in subsequent comments
440	App G – Main Text	5.2.1	143	4	A site use factor of 1 was used for all wildlife. Smaller foraging areas should be evaluated for some species (e.g., the bald eagle, osprey, spotted sandpiper and hooded merganser, mink, river otter) consistent with the exposure information to be presented in EPA's BERA problem formulation.
441	App G – Main Text	5.2.1.1	144	4,5	The prey assumptions for the clam and worm are again UCL of the mean values from site-wide calculations. This may overlook areas with high habitat values and corresponding high prey and sediment concentrations, such as Willamette Cove. Individual composite locations should be evaluated for Round 2 COPCs on an individual basis throughout the ISA. Acceptable tissue levels for the prey can be calculated and applied, and maps can be developed that show the spatial extent of exceedances.
442	App G – Main Text	5.2.1.2.1	145	4,5	The diet of the sandpiper should be evaluated using the laboratory worm data as the more likely prey item. Additional information regarding the dietary pathway evaluation will be presented in EPA's BERA problem formulation.
443	App G – Main Text	5.2.1.2.1	146	2	Dioxin-like PCBs were analyzed for most beaches (13), and dioxins and furans were analyzed for 26 of the beach locations. Therefore, an exposure analysis to "TEQ" can be performed instead of using the co-located clam and worm data. The clam and worm data were collected in-river and not in the beach areas. PCB TEQ, dioxin TEQ and a total of dioxin-like PCBs and dioxins and furans should be evaluated using this data (not just PCB TEQ and dioxin TEQ presented separately). See Table 4-1 in the Round 2A Site Characterization Report dated July 17, 2005, for a complete list of analytes and detections.
444	App G – Main Text	5.2.1.2.1	147-148	4	A BSAF developed using the clam and worm data should be used to predict tissue concentrations of clams and worms where they were not collected, instead of the FWM (e.g. dioxins/furans, PCB congeners, DDTs). BSAF relationships should be explored for other chemicals of importance at the site such as BEHP, dibutyl phthalate, etc.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
445	App G – Main Text	5.2.1.2.2	149	4,5	The hooded merganser was selected as a wildlife receptor in order to represent several guilds of waterfowl that either feed primarily on fish or invertebrates (e.g., common merganser - fish) by altering its dietary composition. As a result, a 100% fish scenario should also be evaluated. Additional information regarding the dietary pathway evaluation will be presented in EPA's BERA problem formulation.
446	App G – Main Text	5.2.1.2.2	150	4,5	A site use factor of 1 should be utilized for the merganser. Smaller foraging areas within the study area should also be evaluated much like the sandpiper. The Report argues that evaluating smaller foraging areas would provide limited value because incidental sediment ingestion is estimated to be small. However, prey ingestion does change significantly throughout the study area. Additional information regarding the dietary pathway evaluation will be presented in EPA's BERA problem formulation.
447	App G – Main Text	5.2.1.2.4	153	4,5	The BERA should evaluate small-scale exposure doses in the prey concentrations. Sample-by-sample (or composite-by-composite) screening should be done against acceptable fish tissue levels (for protection of osprey and eagle). This evaluation will help evaluate the variability (and uncertainty associated with using a site-wide average) in the fish tissue concentrations in bird prey. Several species of fish (e.g., pikeminnow) have significant variability in sample composite concentrations. Additional information regarding the dietary pathway evaluation will be presented in EPA's BERA problem formulation.
448	App G – Main Text	5.2.1.2.5, 5.2.1.2.6	155-159	4,5	Juvenile Chinook salmon should not be used as a prey item for mink or river otter. Peamouth was selected as a resident insectivore to represent that guild and should be used in place of salmon tissue. The uncertainty of assuming a Study-wide sediment foraging area should be replaced by an evaluation of assuming a Study-wide prey foraging area, as mentioned above for other wildlife receptors. Additional information regarding the dietary pathway evaluation will be presented in EPA's BERA problem formulation.
449	App G – Main Text	5.2.1.3.1	159	2	The BERA should evaluate how using smaller foraging areas affects the risk assessment for other wildlife besides the spotted sandpiper. EPCs for all other wildlife receptors were calculated using all data for the Study Area as one exposure dataset using Pro UCL. The details of this analysis are presented in summary table (Table 5-10) and should be described. Total TEQ values of dioxin-like PCBs and dioxins and furans should be calculated using TEF comparisons to 2,3,7,8-TCDD, in addition to the separate dioxin TEQs and PCB TEQs presented in this section.
450	App G – Main Text	5.2.2.1	161	5	The results of the identification of Round 2 COPCs will change with the use of EPA-recommended TRVs. EPA will provide TRVs for use in the BERA in subsequent comments.
451	App G – Main Text	5.3.1.2	176	2	An analysis of bird egg concentrations using the range in concentrations on a composite-by-composite basis should be done to evaluate the spatial variability in risk estimates. The EPC used here was calculated using an upper confidence limit.
452	App G – Main Text	5.2.2.1	161	5	The provisional TRVs developed jointly by EPA and LWG should be used in the SLERA. EPA will provide direction on TRVs for the BERA in subsequent comments.
453	App G – Main Text	5.5.1.2	183	2	Several COIs were not included in the Round 2 COPC screen for birds because there were no TRVs identified. These included antimony, silver, 2-methylnapthalene, hexachloroethane, 2-metholyphonol, 4-methylphenol, phenol, benzyl alcohol, dibenzofuran and N-nitrosodiphenylamine. Chemicals for which no TRVs are available should be identified as chemicals of potential ecological concern in the BERA problem formulation and risk characterization, and presented and discussed in the uncertainty section. As stated previously, EPA will provide subsequent direction on TRVs to be used in the BERA.

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454	App G – Main Text	5.5.1.4	184	2	Table 5-66 shows how the HQ results would change with some modifications to the dietary assumptions. This table shows that there are some key uncertainties associated with not identifying some contaminants as iCOCs for various receptors including: Lead: Bald Eagle, Hooded merganser Mercury: Bald Eagle, Osprey, Mink Selenium: Mink BEHP: Bald Eagle, Osprey *Total PCBs: Bald Eagle, Osprey, Mink, River Otter* Dioxin TEQ: Bald Eagle, River Otter Sum DDE: Osprey Sum DDT: Bald Eagle The BERA should be based on the dietary assumptions presented in the attached problem formulation and EPA-developed TRVs (to be provided in subsequent comments).
455	App G – Main Text	5.5.1.6	188-89	2	This section discusses how some of the results would change if smaller exposure areas were used in the risk assessment. However, specific areas in the ISA that trigger exceedances are not identified. Key changes noted in the LWG evaluation are: Use of maximum sediment concentration: Hooded Merganser: Lead, benzo(a)pyrene, dioxin TEQ doubles Bald Eagle: Dioxin TEQ, mercury Osprey: Dioxin TEQ, Lead, benzo(a)pyrene Mink: Mercury, selenium, dioxin TEQ risk values double River Otter: Dioxin TEQ, NOAEL dioxin TEQ value doubles Use of highest concentration of prey tissue concentrations: Hooded Merganser: Total PCBs, Sum DDT NOAEL doubles; LOAEL HQ>1 Bald Eagle: Mercury NOAEL HQ>1 River Otter: Dioxin TEQ LOAEL >1 The BERA should be based on the dietary assumptions presented in the attached problem formulation and EPA-developed TRVs (to be provided in subsequent comments).
456	App G – Main Text	5.5.1.10	191	4	For determining exposure point concentrations to wildlife (dietary), UCL on the mean should be used, not the mean itself.
457	App G – Main Text	5.5.1.12	192	2	The text points out uncertainties associated with using laboratory worm data to estimate the shorebird diet, claiming that this data may overestimate risk to shorebirds. However, it could be argued that worm data *underestimate* risk to shorebirds feeding on these organisms, since the laboratory data were not corrected for equilibrium conditions. For contaminants of interest mentioned here that have high Kow values, such as PCBs, dioxins and furans, and DDTs, it is likely that equilibrium was not reached during the 28-day testing period. Correction factors can be applied to the data to estimate what the concentrations in the worms would have been if they had been allowed to reach equilibrium. These factors can be found in the EPA and Army Corps of Engineers Upland Testing Manual. As for comparisons to the field clam data, it should be expected that worms, which live and feed in the sediment, may have higher accumulation than filter feeding clams, which feed at the sediment surface and water interface.
458	App G – Main Text	5.6	195	1	Several of the risk conclusions presented in this section will change in the draft BRA Report, based on previous comments.

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459	App G – Main Text	6.1.2	198	4,5	Exposure to shoreline seeps and beach sediment (which should be similar to riparian soil) should be complete. A revised CSM will be presented in EPA's BERA problem formulation. Other changes include: Exposure to seeps should be complete and major; and Exposure to transition zone water should be complete and minor.
460	App G – Main Text	Figures	5-3	2	Figure 5-3 depicts beach locations by number (e.g. B1-28). However, figure designations do not match the beach numbers and locations presented in the Round 2A Report. Please clarify this apparent discrepancy.
461	App G – Att G2	2.0	3	2	The reliability evaluation compares published SQGs with the reliability of the effects level 2 derived for this site. However, the published numbers use and predict different endpoints, and therefore the comparison really cannot be made. This would explain some of the skewed results of these SQGs, e.g., a higher false positive rate. In addition, it should be noted that the predicted models are expected to perform better when evaluated using same-site data than a model developed using data from another site. It would be a useful exercise to use the Round 3B bioassay data to validate the benthic toxicity predictive models. EPA acknowledges the difference between toxicity predicted based on application of SQGs and that predicted using the benthic toxicity predictive models, and has weighted them appropriately in the weight of evidence (WOE) framework included in the attached problem formulation.
462	App G – Att G2	3.1.2	8	2	This tissue should be corrected for equilibrium conditions using Kow correction factors.
463	App G – Att G2	3.2	9	2	Attachment G2, Invert RA, Page 9, Section 3.2, Predicted Tissue Assessment: The BSAF analysis discussed here should be presented, including scatter plots of the relationships between tissue and sediment concentrations and any model developed. Calculated BSAFs by location should be presented in the table format used in the analysis. Using the average of the BSAFs if the BSAF was found to be independent of sediment concentration may not be the best alternative. The text also indicates that non-detect concentrations were used in the analysis. Non-detects should not be used – they may indicate elevated reported limits. The text states "if the BSAF decreased as the sediment concentration increased and the tissue concentrations at the higher sediment concentration were non-detects, a BSAF was not determined." BSAFs were not determined for PCBs, dioxins and furans, or DDTs because they are considered in the food web model. There may be some utility in developing BSAFs for these chemicals, in addition to relying on the results of the food web model. For example, location-specific BSAFs for field clams, lab clams, lab worms, and crayfish could be generated, and an additional BSAF analysis that looks at site-wide relationships could be conducted.
464	App G – Att G2	3.2	10	4	COPCs were identified by multiplying the 95th percentile of the site-wide sediment concentration by the BSAFs and comparing the result to the aquatic tissue TRV. Instead, the BSAF developed from the field and lab worms and the co-located sediment data should be applied to each sediment chemistry location, and areas above the TRV should be plotted. This will predict clam and worm tissue exceedance locations from sediment data where we don't have benthic tissue.
465	App G – Att G2	4.0	11	4	Only the near bottom surface water samples were used to evaluate the benthic community. However, we need to evaluate all invertebrates exposed to surface water (e.g., epibenthic and water column invertebrates), and we should be using all water samples as an initial screen. Each water sampling location should be screened individually (not averaged).
466	App G – Att G2	4.1.2	11	2	The screening process for water excluded individual dioxins and furans detected in surface water or TZW. Only the results for 2,3,7,8-TCDD are presented. However, since the Report states that "the Eco SLs are considered to be protective of all aquatic receptors including benthic invertebrates, fish and amphibians," the BERA should apply Toxicity Equivalency Factors to sum the dioxins and furans in order to compare a dioxin TEQ to the 2,3,7,8-TCDD Eco SL.

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
467	App G – Att G2	4.1, 4.2	11-12	4	A number of crustal elements were eliminated from this evaluation, including aluminum, beryllium, cobalt, iron, magnesium, manganese and potassium. These should be screened like any other COI since they can be elevated and toxic as a result of industrial activity. See previous comment on this topic.
468	App G – Att G2	4.2	12	5	TPH, including diesel-range hydrocarbons, gasoline-range hydrocarbons, and residual-range hydrocarbons, were identified as COIs for benthic invertebrate receptors based on TZW data (Table 4-3). However, they were not evaluated in the Round 2 COPC screen because "LWG and EPA are currently discussing the TPH Eco SLs and TPH." Further discussion between EPA and LWG is required to determine how to assess TPH.
469	App G – Att G2	4.2	12	2	Table 4-4, Results of COPC Screen of TZW: This list should include all contaminants detected that screen in or contaminants that do not have screening values and their detected concentrations (e.g., dioxins and furans). Chemicals without screening criteria should be identified as chemicals of potential ecological concern in the BERA problem formulation and risk characterization, and presented and discussed in the uncertainty section. Crustal elements should be added to this table. For metals, screening with both dissolved and total concentrations should be conducted.
470	App G – Att G2	4.2.3	13	2	The text states that "for the hydrophobic organic COIs that were not identified as TZW COPCs and for which K_{oc} values were available, an equilibrium partitioning evaluation was conducted to determine whether or not the COI was present within the Study Area at concentrations that could result in exceedances of water SLs." However, the only COIs evaluated included only one PAH (acenaphthylene) and six VOCs (1,1-Dichloroethane, 1,2-Dichloroethane, acetone, chloroform, methylene chloride and trans-1,2-Dichloroethene). The BERA should clarify how this list was developed and/or the objectives for the evaluation. Many of these chemicals may have limited partitioning relationships with organic carbon. The potential for clean groundwater to pass through contaminated sediment, resulting in a flux of contamination to the transition zone, should be evaluated for a much larger suite of chemicals. In addition, a site-wide maximum organic carbon concentration was used in the evaluation – this should be site-specific, as OC can vary throughout the study area.
471	App G – Att G2	Tables	4-2	2	Table 4-2, Results of Round 2 COPC Screen of Near Bottom Surface Water, appears to present the wrong PCB Aroclor SLV. The sum should equal the total PCB number, and all of the Aroclors have to meet this value individually.
472	App G – Att G2	Figures	2-1 thru 2-5	2	The results of the SLERA and BERA should present tables and figures that depict which contaminant exceedances are predicted by the models.
473	App G – Att G4	2.2	2	4	COIs should include crustal elements in the screening step. See previous comment.
474	App G – Att G4	2.2	2	2	PAHs, if detected, should also be included in the tissue residue approach as another line of evidence in assessing risk to fish, as well as just looking at where and which fractions were detected in different fish tissue. This is especially relevant for fish with benthic associations such as sculpin, largescale sucker and smallmouth bass. Although PAHs are metabolized, they can and have been detected in fish tissue. If a fish's metabolism is overwhelmed, PAHs can begin to accumulate in tissue, and this is an important line of evidence that exposure is occurring. According to the Round 1 Site Characterization Report, PAHs were detected in fish tissue. Although there were detection limit issues, PAHs were detected at Georgia Pacific (approx. RM 3.5), T-4, Slip 1, Linton Plywood, Marine Finance, US Moorings, Willamette Cove, RR Bridge downstream of ARKEMA, Willbridge, Cascade General, and Lakeside Industries / Shaver. The highest concentration was at the RR Bridge outfall/Siltronic, at 132 ug/kg. Specific PAHs detected in sculpin tissue included acenaphthene, fluorene, and naphthalene. PAHs were also detected in largescale sucker tissue in the same area (fish composite 07009) at a total PAH value of 147 ug/kg. Other PAHs detected included fluorene, naphthalene and 2-methylnaphthalene. The smallmouth bass at the same composite number (07R009) also had the highest concentration (308 ug/kg) of total PAHs in tissue.

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475	App G – Att G4	2.2	2	2	Dioxins and furans as well as dioxin-like PCBs should be assessed together in a TEQ analysis with comparison to a 2,3,7,8-TCDD TRV. See previous comment.
476	App G – Att G4	2.3.1-2.3.7	4-6	5	The Round 2 Report eliminates COIs that screened in based on elevated detection limits. A summary is provided below: • Large scale Sucker: Dibutyl phthalate, beta-HCH, and delta-HCH had detection limits higher than the TRV, but were not carried forward as COPCs. Tissue was not analyzed for butyltins. • Carp: The appropriate dioxin TEQ analysis screening needs to be completed (Carp was evaluated based only on 2,3,7,8-TCDD detections). Although Carp was analyzed for other COIs, they were not evaluated in this Report. • Sculpin: Detection limits exceeded the TRVs occurred for dibutyl-phthalate, delta-HCH, and hexachlorobutadiene. Tissue not analyzed for butyltins. • Juvenile Chinook: Detection limits exceeded the TRVs for BEHP, butylbenzyl phthalate, and dibutyl phthalate. • Peamouth. Tissue not analyzed for butyltins, dioxins, furans, PCB congeners; phthalates, phenols, and SVOCs. • Smallmouth Bass: Detection limits exceeded the TRV for Beta-HCH, delta-HCH, and dibutyl phthalate. Tissue not analyzed for butyltins. • Northern Pikeminnow: Detection limits exceeded the TRV for Beta-HCH and delta-HCH; tissue not analyzed for butyltins, dioxins, furans, dioxin-like PCB congeners, phthalates, phenols, and SVOCs. These chemicals should be retained.
477	App G – Att G4	3.0	8	2	A predicted tissue assessment should be presented for those contaminants analyzed in the food web model (PCBs, dioxins and furans, and DDTs). This will help verify the food web model, especially in localized areas. BSAFs developed in localized areas may outperform the model.
478	App G – Att G4	4.0	9-11	2	It is stated that a site use factor (SUF) of 1.0 was assumed for all fish species for the identification of Round 2 COPCs. For some receptors, an SUF smaller than 1.0 (smaller than the entire site) should have been used. This may change the results of COPC identification using the dietary approach. In addition, the report should clarify whether an SUF greater than 1.0 was used in the subsequent analysis (the identification of iCOCs.
479	App G – Att G4	4.0	10	2	The text states that "the maximum concentration in any of the associated species in the ERA dataset" was used to identify Round 2 COPCs. However, the maximum was only selected from a select dietary matrix for that species. Potential prey species such as laboratory-exposed clams were not used for any prey species, which could underestimate exposure where the field clams had elevated detection limits or were analyzed for a reduced suite of analytes. A sensitivity analysis should be run using conservative dietary fractions for the identification of COPCs, with an expanded list of potential dietary items. In addition, some tissue either was not analyzed for certain COIs or had elevated detection limits, and it is unclear how this influences the results. It is surprising that sculpin did not screen in for any COI, given that its small home range puts it in contact with high sediment and prey concentrations. Since the details of the Round 2 Report analysis are not presented here, the reasons for this should be investigated. It is also not clear, for example, why only worms, field clams and other sculpin were investigated as dietary items for the sculpin.
480	App G – Att G4	5.1.23	12	2	Surface water should be screened using a TEQ approach. This analysis only looks at 2,3,7,8-TCDD and screens the rest of the detections of other dioxins and furans out because "no data were available." See previous comment.
481	App G – Att G4	5.3.4	15	2	Even though concentrations of dissolved copper in the study area ranged from 0.37 to 1.64 ug/L, which is within the range of the TRV for effects (0.10 to 88 ug/L), this line of evidence was not carried forward for further evaluation in the risk assessment to fish receptors.

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482	App G – Att G4	6.3	21	2	Even though the spatially weighted average PAH concentration in the study area (24,285 ug/kg) is above the threshold presented by Johnson et al. (2002) and Stern et al. (2003) (240 to 4,000 ug/kg), this line of evidence was not further evaluated in the risk assessment for fish.
483	App G – Att G4		31	2	It is inappropriate to screen data using TRVs for 4,4'-DDE and 4,4'-DDT that are higher than the total DDT TRV. TRVs for individual chemical should be lower or the same as the total DDT number.
484	App G – Att G4	Table 3-1	47	2	Each composite should be normalized individually by lipid content, and these individual sample lipid-normalized fish tissue concentrations should then be used in the predicted tissue analysis, including the max predicted tissue concentration.
485	App G – Att G6	2.1.2	4	2	Attachment G6, Wildlife RA, Page 4, Section 2.1.2, Identification of COPC's: Several COIs were not carried forward as COPCs because no TRV or appropriate surrogate was identified. For birds, these include: antimony, silver, 2-mehtylnaphthalene, hexachloroethane, 2-methylphenol, 4-methyphenol, phenol, benzol alcohol, dibenzofuran, and n-nitrosodiphenylamine. For mammals, these include: Antimony, silver, 2-methylphenol, 4-methylphenol, benzyl alcohol, dibenzofuran, and n-nitrosodiphenylamine. Such chemicals should be identified as chemicals of potential ecological concern in the BERA problem formulation and risk characterization, and presented and discussed in the uncertainty section.
486	App G – Att G6	3.1.1	7	2	In addition to the evaluation of a dioxin TEQ and a dioxin-like PCB TEQ in the bird egg approach, a TEQ total that includes the summation of dioxins and furans and dioxin-like PCBs into one TEQ should be evaluated.
487	App G – Att G6	Tables 2-1, 2-3	15	2	Several COIs were only detected in invertebrate tissue. According to Table 2-1, these include tetrabutyltin, diethyl phthalate, dimethyl phthalate, and di-n-octyl phthalate. These should be further evaluated with respect to uncertainties in the existing fish tissue data. Other chemicals were detected in surface sediment, but were not analyzed for in fish or invertebrate tissue (Table 2-3). These chemicals should be evaluated in the uncertainty analysis.
488	App G – Att G6	Tables 3-1, 3-2	44	2	The biomagnification factors (BMFs) utilized in the Round 2 Report are generally consistent with BMFs presented in DEQ's *Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment*, with the exception of total PCBs for the bald eagle. In this instance, the BMF selected for DEQ's guidance is significantly higher than the BMF presented in the Round 2 Report (113 versus 11).

Comment Number	Section	Subsection	Page Number	Comment Category	Comment/Summary
489	App G – Att G7	Tables 2-2, 2-4	14, 16-18	2	Although not specified in the text, the following amphibian sampling locations exceeded the Eco Screening level TRVs (see also Table 2-6, page 20): Zinc (dissolved): Fireboat Cove, during the Nov. 2004 sampling event. 4-Chloro-3-methylphenol: Mouth of Multnomah Channel – south side, during the March 2005 sampling event. Total PCBs: International Slip - Tip, during the March 2005 sampling event; Willamette Cove was very close to the SLV (0.0120). 2,4'-DDT: OSM – downstream end, during the March 2005 sampling event. 4,4'-DDT: Gunderson – downstream of site, during the March 2005 sampling event. Total DDTs: OSM – downstream end, during the Nov. 2004 sampling event; Willbridge Cove near Saltzman Creek, during the March 2005 sampling event; Gunderson, downstream of site, during the July 2005 sampling event. Note that several amphibian exposure areas with corresponding surface water sampling locations were not included in the screening although they were identified by EPA as amphibian habitat. Figure 6-1 in the main text of the appendix shows the amphibian habitat, but not all of the corresponding water samples taken at those locations. These included water sampling locations W12 off the GASCO pond area, W15 (Rhone Poulenc / ARKEMA near the RR Bridge), and W16 off ARKEMA, W20 in Swan Island Lagoon, and W22 in Fireboat Cove. This will change some of the identification of COPCs in Table 2-2, Attachment G7. For example, GASCO has several PAHs that exceed the chronic Eco SL. These locations are not listed in Table 2-3 on page 15, which summarizes the amphibian exposure areas. These samples should be added and screened.
490	App G – Att G8	3.2	9	2	Since aquatic plants are sessile, the exposure point concentration for aquatic plants should be point-by-point screening. Areas that exceed, such as those mentioned here, should be identified as posing a risk to plants in that area (amphibians are mentioned here, but EPA assumes that the correct reference is aquatic plants). The text statement "the aquatic plant community of the LWR consists of species that are expected to exist in the habitat of an industrial harbor providing additional evidence that risks to aquatic plants at the Study Area are not significant at the community level" should be removed.
491	App G – Att G8	Tables 3-1 and 3-2	18, 19	2	Screening tables should be presented for TZW and aquatic plants. It is not clear how some of the contaminants (esp. herbicides) are screened out.